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Contents . . January 14, 1935

Volume 96 ◆ Number 2

AS THE EDITOR VIEWS THE NEWS 7

NEWS OF THE WEEK:

Wood, Carse, Quit; Gregg, Perry, Rhodes Elevated 8

NRA	9	Financial	10
Foreign	9	Meetings	10
New Capacity	9	Labor	11
Forecasts	10	Safety	11
Durable Goods	10	Steel in the News	11
Basing Points	10	Production	11
Transportation	10		

December Steel Ingot Output Up 27 Per Cent 12

Windows of Washington 13

Mirrors of Motordom 15

Obituaries 16

Industrial Men in the Day's News 17

EDITORIAL—Gains in 1934 from Federal Aid 19

THE BUSINESS TREND 20

ENGINEERING DEVELOPMENTS:

Large Shrink Fits	22	Steelmaking Progress	32
Helical Gears	25	Indicating Roll Gap	33
Methods and Materials	28	New Equipment	34
Sheet Annealing Covers	29	Trade Publications	36

MARKET REPORTS AND PRICES 37-52

HERE AND THERE IN INDUSTRY 52

CONSTRUCTION AND ENTERPRISE 53

ADVERTISING INDEX 58

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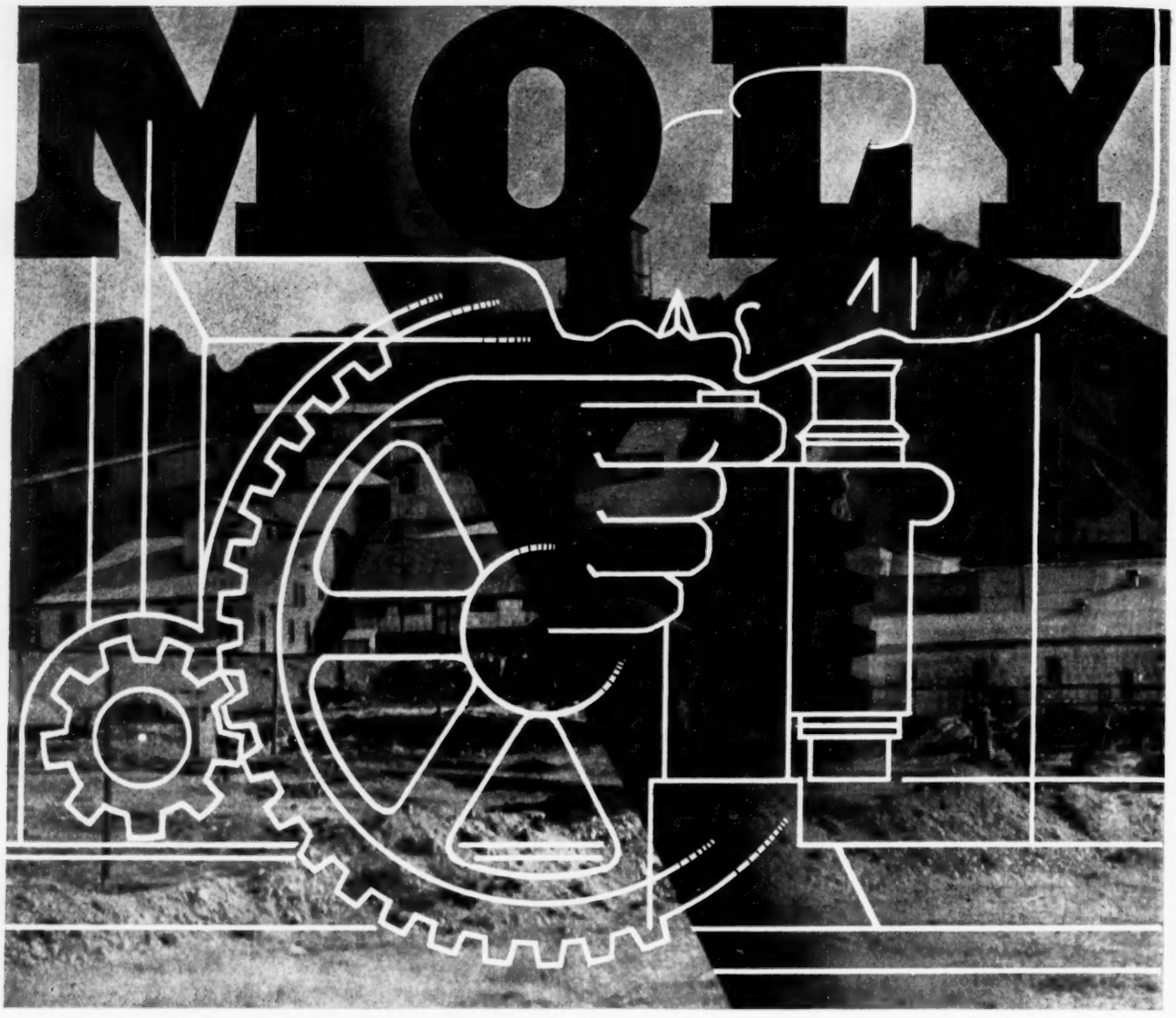

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As the Editor Views the News

PRESENTATION of the national budget last Monday by President Roosevelt has served the useful purpose of directing the attention of legislators, employers, employes and the public to the stern realities of the problems involved in relief and recovery. The budget message, as a complementary document to the President's address to congress on Jan. 4, makes clear the cost and the difficulties attending his declaration of determination that "the federal government must and shall quit this business of relief." It also emphasizes the necessity of shifting emphasis immediately from reform and relief expedients to methods which will promote rather than retard natural recovery.

• • •

Gain in 1934 Due to Relief

If proof for the need of this shift is required, it is available in the record of the steel industry for 1934. Production of steel ingots in that year increased only 10.4 per cent over the total for 1933. It is not difficult to trace tonnage to the equivalent of that percentage to the result of government financing or indirect federal aid. This means (p. 19) that private demand for steel which was not artificially created probably was no greater in 1934 than in 1933. Stated another way, federal relief accounted for practically all of steel's net gain in output in 1934.

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Clear the Way for Business!

It is as important to get industry off relief as it is to transfer individuals from relief to public work and ultimately to employment by private industry. Recovery will be speeded and re-employment hastened if the emphasis will be placed as heavily upon restoring the opportunity for expanding business as it has been directed to the relief of individuals. Such emphasis, which is in line with the President's latest statement (Jan. 4), would mean that irritants such as those arising from the labor mess (p. 11) would be eliminated by the government administration which incited them, that wage and hour legislation not conducive to recovery be abandoned and that other obstacles be removed. To encourage industry to sell a million dollar order to meet a natural demand is more desirable than to create a four million dollar public works project. It means more in employment and in real recovery.

• • •

More Shifts in U. S. Steel

Shifts in the allocation of executives of United States Steel and its subsidiaries, announced Thursday, bring the total of changes effected during the past two weeks to an even dozen. In all cases but one, the appointments involve officials identified with U. S. Steel companies for many years. In the one exception, the selection of Robert Gregg—long affiliated with an independent company—as vice president in charge of sales of the corporation after an association of only 29 months with the Tennessee subsidiary may be considered an infusion of new blood into the executive family of 71 Broadway. There he will be associated with Edward R. Stettinius Jr. and Arthur H. Young, acquired in 1934 from ranks outside the corporation.

• • •

Industry Uses Dry Ice

Industry's extensive experience with temperatures has dealt almost exclusively with heat. Recently it has been focused upon heat losses, as, for instance, using a layer of insulating cement on an open-hearth furnace (p. 32), thereby saving 21 per cent in fuel. But while industry is enhancing its knowledge of heat, it also is exploring the possibilities of cold. Several times STEEL has referred to the use of refrigerants for shrink-fit assemblies. That this method is practical is proved by the success with which a fabricator (p. 22) employed dry ice in a bath of alcohol to shrink four large bearing hubs into girders for a bascule bridge.

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A new service, inaugurated in this issue (p. 20), is STEEL'S index of activity in the iron, steel and metalworking industries. It is up sharply in the first week of 1935.

E. L. Shaner

Wood, Carse Quit U. S. Steel; Gregg, Perry, Rhodes Move Up

A REORGANIZATION of personnel by the United States Steel Corp. which is the most drastic since Myron C. Taylor completed the first phase of his new deal on becoming chairman of the finance committee in 1928 involves:

Resignation of Charles L. Wood as vice president in charge of sales, in New York.

Promotion of Robert Gregg, president of the Tennessee Coal, Iron & Railroad Co., to succeed Mr. Wood.

Appointment of J. L. Perry, vice president of the American Steel & Wire Co. in Cleveland, as the new president of the Tennessee company in Birmingham.

Retirement of John B. Carse as chairman of the purchasing agents' committee and director of purchases, in New York.

Selection of Charles H. Rhodes, of the Illinois Steel Co., as the successor to Mr. Carse.

Additional changes are in prospect, possibly including the reorganization of several sales districts with the adoption of unified control of all Steel corporation sales activities.

Studies have been made in at least three districts in the West and one in the East to determine the economy and efficiency that might be generated if the sales activities of all subsidiaries were concentrated.

Robert Gregg

In the Cleveland offices of the Steel & Wire company, a successor to Mr. Perry remains to be selected, and the retirement of another high official is rumored.

Only a fortnight ago, the American Sheet & Tin Plate Co., also a Steel corporation subsidiary, started the new year with a general overhaul (STEEL, Jan. 7, p. 256) of its higher personnel through the retirement of J. I. Andrews, vice president in charge of sales, and a succession of changes growing out of this action.

At the same time, the direction of sales in St. Louis for the Carnegie, Illinois and Tennessee companies was changed when Stillman W. Wheelock retired and Griswold A. Price succeeded him. Altogether, there have been 12 important changes in personnel in the Steel corporation or its subsidiaries thus far in 1935.

Incidentally, the Steel & Wire company office in Cleveland last week relieved the Carnegie Steel Co., in Pittsburgh, of the duty of making its scrap purchases in that district.

Wood Veteran Executive

For the retirement of Mr. Wood, since June, 1932, its vice president in charge of sales, the Steel corporation cites ill health. With the iron and steel industry since 1896, on leaving Ohio State university, Mr. Wood, who is 62, has been with the Corporation or its predecessors his entire business life. He was made general sales manager of Carnegie in 1925, and a vice president in June, 1930, which he relinquished to go to New York in 1932.

Mr. Gregg, who beginning Feb. 1 will advise on sales of all subsidiaries, has the unique distinction of being one of the few men to reach a high place in the Corporation after entering its employ in midstream. Fifty years old, a native of Atlanta and a graduate of Cornell, he began his business career in August, 1907, with the Atlanta Steel Co. On Aug. 1, 1932, he left its successor company—the Atlantic Steel Co.—to become vice president of the Tennessee company and in October, 1933, was made president.

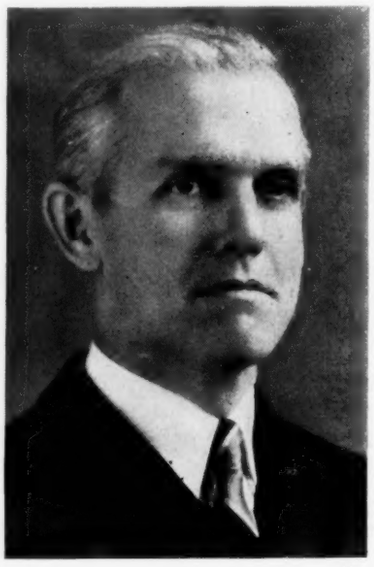
Mr. Perry, who now goes to Birmingham to head up the southern subsidiary of the Corporation, was born in Worcester, Mass., in 1881 and has a record of continuous service with the Steel & Wire company dating from Aug. 4, 1899. After holding many posts at both the North Works and South Works in Worcester, he became district manager there in 1928, and on Jan. 1, 1933, went to Cleveland as vice president in charge of operations.

New Director of Purchases

Mr. Carse, retiring director of purchases, has been connected with the Corporation since 1903. Prior to that he was affiliated with various machinery and engineering organizations in Chicago.

His successor—Mr. Rhodes—is 54, a native of New Castle, Pa., and has been with subsidiaries of the Corporation since 1899. After being affiliated with the Steel & Wire company the Illinois company and the Universal Atlas Cement Co., he retired in 1929, but returned to Illinois four years later.

Since the advent of Mr. Taylor in the Corporation following the death of Judge Gary late in 1927, new blood has been admitted to high councils of the Corporation.



J. L. Perry

Mr. Gregg was first, entering the Tennessee company in 1932 as vice president. Last year, Edward R. Stettinius Jr. was taken from General Motors to become vice chairman of the finance committee, and Arthur H. Young was made vice president in charge of public relations. Previously, the line of succession always had been through the personnel of subsidiaries.

NRA

PRICE fixing was pilloried and open prices commended at the hearing held last week by the national industrial recovery board on price provisions in NRA codes.

At the outset of the hearing the attitude of NRA was clearly defined. Said Leon Henderson, member of the recovery board:

"The original ideal of NRA was a system providing publicity so that everyone might have notice as to what prices were being quoted. It was thought that secret rebates and secret price concessions would be dissipated if a strong open price policy were maintained. The NRA policy is to get back to those ideals."

Also Blackwell Smith, counsel for NRA:

"Open price filing properly administered is to be promoted in every way possible. The only question is, what are the results of abuses, possibly including waiting periods, that might surround the question of open price?"

Among witnesses, John W. O'Leary, Chicago, president of the Machinery and Allied Products institute, advocated open price filing as a "step forward in the economic process," with a provision for a waiting period between the time prices are filed and the time they become effective.

Avoids Discrimination

Herman H. Lind, Cleveland, general manager of the National Machine Tool Builders association, emphasized the importance of open price provisions as against fixed prices and the necessity for a waiting period "to prevent discrimination between customers."

J. Harvey Williams, Buffalo, chairman of the Wrench institute and member of the drop forge industry code authority, declared "the independent producer needs price stabilization measures in order to remain independent and to prevent the growth of monopoly."

Frank A. Bond, Pittsburgh, representing the code authority of the chain manufacturing industry, also an adherent of open prices, called a waiting period a definite need "to keep the mentally dishonest from taking advantage of the mentally honest."

Strong support for open price provisions of codes as being not merely a defense provision but constituting "one of the most fundamentally constructive steps toward making it possible to have intelligent management of American business" came from Henry S. Dennison, of the Dennison Mfg. Co., Framingham, Mass.

NEW JERSEY NRA DROPPED

New Jersey last week turned its back on NRA after having been one of the first states to set up an intrastate NRA, including a code for the structural steel industry. A proclamation from Acting Governor Powell, Republican, accompanied by a statement that recovery laws were driving business out of the state, ended the state NRA. Governor Powell cancelled all levies and unpaid assessments and wiped out machinery costing manufacturers $750,000 a year.

Almost simultaneously the Oltmer Iron Works Inc., Jersey City, N. J., attacked the state code as unconstitutional.

¶Aluminum code, expiring Jan. 6, has been extended for 45 days. Originally approved June 26 for a 90-day period, it was renewed for 90 days or to Jan. 6. In extending the code a survey by the division of research and planning was directed.

Foreign

A RESOLUTION protesting any move by the government to restrict exports of iron and steel scrap was adopted recently by the New York chapter of the Institute of Scrap Iron and Steel Inc. which, incidentally, is host to the annual convention of the institute in New York, Jan. 15-17. So heavy have exports of scrap become (over 1,800,000 tons in 1934) that rumors of possible government intervention have started.

COLD NO HANDICAP

No. 4 blast furnace of the Kuznetsk steelworks in Russia, a purely American-type stack with a daily capacity of 1100 tons, was charged in December. As was the case in 1933, when No. 3 stack was lighted in mid-January, severe winter conditions have not handicapped the plant.

New Capacity

GREER STEEL CO., Dover, O., has purchased 36 acres on the outskirts of Anderson, Ind., as a site for a plant for cold-rolling steel strip.

Buildings, mills to handle strip up to 48 inches wide, and auxiliary equipment will cost approximately $500,000. Capacity will be 3000 to 5000 tons a month, and employment will be afforded 150 to 200 men.

Established at Dover, O., in 1918, the company maintains branches in Detroit, St. Louis, Grand Rapids, Mich., and Bridgeport, Conn. H. C. Greer is president.

BREAK GROUND AT McDONALD

Carnegie Steel Co. expects formally to break ground for its new continuous strip mill at McDonald works in the Youngstown, O., district some time this week. Recently Lowensohn Construction Co., Cleveland, was awarded contract for the mill's foundations.

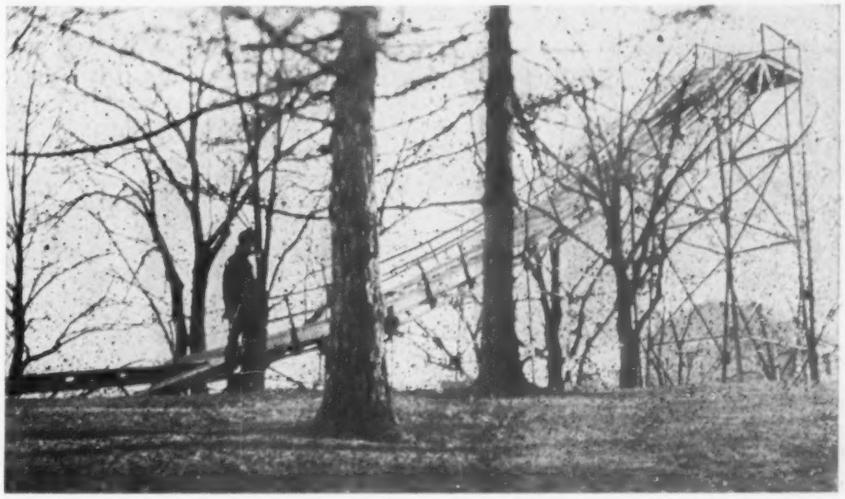
COLD METAL BOOKS MILLS

Cold Metal Process Co., Youngstown, O., has booked from the Dominion Foundries & Steel Co. Ltd., Hamilton, Ont., an order for a 20-inch, single stand cold mill, and from the West Leechburg Steel Co., Leechburg, Pa., a single stand 20-inch reversing cold mill, the sixth of its type to be installed at Leechburg.

SEEK LOAN FOR STEELWORKS

Nanking government in China is reported to have given approval to a plan of the Kwantung provincial administration to obtain an American loan of $10,000,000 in gold to build

Steel Goes Athletic



Steel has replaced wood in a ski slide erected at the University of Wisconsin, Madison, Wis. The tower depicted above is 42 feet high and is securely anchored to concrete piers, as are the other supports. When weather conditions permit, snow is placed on the track

an iron and steel plant, which has been designed by the Arthur G. McKee & Co., Cleveland. W. A. Haven, vice president of the McKee company, returned recently from China. This project, like most Chinese ones, depends upon obtaining credit.

Forecasts

E. J. BUFFINGTON, retired president of the Illinois Steel Co., Chicago:

"After experience in the steel industry extending over nearly 50 years and remembering what has transpired in previous major depressions, I cannot but believe that the day is not far distant when returning demand for steel and other durable goods will start our factories and mills operating well toward full capacity."

D. A. Williams, president, Continental Steel Corp., Kokomo, Ind.:

"We confidently expect 1935 to be a better year. Last year showed improvement over previous years in many ways and we look for a continuation of this improvement. We are interested in both rural and industrial fields; naturally, the steadily improving conditions of the farmer as compared with last year, mean a bigger and better farm market, and this we expect will be reflected in better business generally in 1935."

Philip E. Bliss, president, Warner & Swasey Co., Cleveland:

"Present indications point to a substantial improvement in the machine tool industry in 1935. The healthier credit situation, the probability of a revision of the Securities act, the progress of general business recovery, the vast extent of immediate replacement needs so evident in many industries, and the probability of growing machine tool exports, all point toward a better market for machine tools. It may well happen that the upturn will materialize before we are aware of it—resulting in an actual shortage of machine tools."

Durable Goods

MACHINERY and Allied Products institute, 815 Fifteenth street, Washington, has launched a survey to determine the extent to which replacements and additions of machinery and equipment have accumulated in factories and other enterprises in the five depression years since 1929.

First questionnaires to be returned to A. N. Gonsior, of the research division of MAPI, indicate a flood of orders is dammed up. Many firms report requirements in excess of $200,000, one $1,000,000 and another $2,000,000. Conditions upon which many say they will buy are sound governmental policy, restored confidence and reasonable methods for financing. Obsolescence is attracting increased attention.

Basing Points

THE stalemate between NRA and the federal trade commission on a report on iron and steel basing points continued last week. It will be recalled that the President, in extending the steel code last May 30, directed both groups to study basing points and submit a report Dec. 1. Co-ordinator Richberg has been endeavoring to reconcile opposing views. NRA, in general, favors the present system; the trade commission is opposed, and refuses to modify its stand to permit a joint report.

Transportation

NO STEEL interests have applied for time in the oral argument, begun before the interstate commerce commission Jan. 9, on the petition to the railroads for freight rate increases to net them $170,000,000 annually. H. H. Burton, representing the Lake Superior Iron Ore association, Clevelan, has been allotted time. On conclusion of the oral argument the commission will consider the case.

Financial

TO BONDHOLDERS of the Algoma Steel Corp., Sault Ste. Marie, Ont., has been submitted a plan for capital reorganization by which they would receive both preferred and common stock for their holdings.

Sir James Dunn and associates would provide $5,000,000 new money and in return receive $5,000,000 of first mortgage, 20-year, 5 per cent bonds and common stock in the new company, to be known as Algoma Steel Corp. Ltd., with an Ontario charter.

Present holders of $14,341,453 of 5 per cent first and refunded mortgage bonds would receive 74,718 common shares, pro rata, and holders of $5,278,000 of purchase money bonds would receive $100 par 6 per cent preferred stock at the rate of 50 cents on the dollar of present holdings. Present bondholders will meet in New York, Feb. 6, to vote on the proposal.

DIVIDENDS DECLARED

National Steel Corp., Pittsburgh, an extra of 12½ cents per share in addition to the regular 25 cents, both payable Jan. 31 to record of Jan. 21.

Standard Steel Spring Co., Coraopolis, Pa., 25 cents, payable Jan. 16 to record of Jan. 14, first dividend since December, 1931.

Allegheny Steel Co., Brackenridge, Pa., regular quarterly $1.75 on preferred, payable March 1 to record of Feb. 15.

Central Tube Co., Pittsburgh, 5 cents on its common, payable Jan. 25 to record of Jan. 15.

Iron Fireman Co., Portland, Oreg., and Cleveland, $1 per share on the common. Last month the company distributed a dividend of 50 per cent. Earnings in 1934 were $520,000, against $330,000 in 1933.

BYERS' LOSS REDUCED

A. M. Byers & Co., Pittsburgh, and subsidiary, reporting for 12 months ending Sept. 30, 1934, show net loss of $773,748 compared with net loss of $1,044,056 in the preceding year.

CREDITORS FORM COMMITTEE

Unsecured creditors of the Follansbee Bros. Co., Pittsburgh, now in receivership, recently organized a permanent committee to represent them in any reorganization plan. Louis Berkman, Steubenville, O., was named chairman of the committee; C. B. Everberg, secretary; and L. L. Dalbey, Youngstown, O., the third member.

Meetings

ANNUAL meeting of the National Association of Used Machinery and Equipment Dealers will be at the William Penn hotel, Pittsburgh, Jan. 19, preceded by a meeting of the board of directors on Jan. 18. Officers for 1935 will be elected, and plans discussed with reference to the used machinery code. M. D. Galbreath, of Pittsburgh, is president of the association; S. A. DeWitt, of New York, vice president; and C. L. McDonald, of St. Louis, treasurer.

HOLD CARNEGIE DINNER

Carnegie Steel Co., Pittsburgh, held its annual Carnegie dinner at the Duquesne club, Pittsburgh, Jan. 12. The dinner, long an annual custom, followed one given by the United States Steel Corp. in New York, Jan. 8.

CALLS WELDING CONFERENCE

Texas Technological college, Lubbock, Tex., is announcing its first annual welding conference on electric and oxyacetylene welding for Feb. 14 and 15. All manufacturers and jobbers of welding equipment are invited to display and demonstrate their equipment. Inquiries should be addressed to Prof. H. F. Godeke.

ASTM MEETINGS FOR 1935

American Society for Testing Materials has scheduled these meetings for 1935: March 6, regional meeting at Philadelphia; March 4-8, group meetings of committees at Philadelphia; June 24-28, annual meeting at Detroit, with concurrent exhibit of testing apparatus.

Labor

ON THE steel labor front both sides went into the trenches last week and exchanged one round, but Washington refused to believe that a war actually has started. In fact, through the department of labor it was preparing to seek an armistice.

Submitting to the logic of events and to pressure from the Amalgamated Association of Iron, Steel and Tin Workers, the national steel labor relations board ten days ago ordered elections to be held for the selection of representatives for collective bargaining at the McDonald, O., and Duquesne, Pa., works of the Carnegie Steel Co.

This it followed closely with a similar order affecting the Gary, Ind., works of the Illinois Steel Co. and the East Chicago, Ind., and South Chicago, Ill., plants of the Youngstown Sheet & Tube Co. Accompanying these orders were demands for payrolls, and it is on these payrolls that the present issue hinges. No payrolls, no list of eligible voters.

Appeal to Circuit Court

In the United States circuit court of appeals at Philadelphia and Cincinnati, attorneys for the employe representation plan of the Carnegie company last week filed a petition for a review of the findings and the order of the labor board. Officially, the petitions were filed not on behalf of the companies themselves but by their employe representatives. The strategy is identically that adopted by the Firestone Tire & Rubber Co. in combating a similar order.

At least for the present, it can be definitely stated, the steel industry does not plan to present a united front against the labor board and elections. The tactics will be identical but each order will be contested by the respective employe groups.

It will be contended generally that the employe plans are adequate vehicles for collective bargaining, that employes have had opportunity to express their choice, that membership in these plans is voluntary, and that in any event manufacture of iron and steel is not an interstate matter.

Secretary of Labor Perkins indicated last week that her department is studying the suits and is likely to make a gesture for a truce, of the type the President proposed in his fireside radio address of Sept. 30, but which was rejected by the Amalgamated association because the steel industry would not concede to its demands for a closed shop.

REPUBLIC WINS ON POINTS

National steel labor relations board Friday handed down two decisions in connection with the Republic Steel Corp. dealing with its Warren and Niles, O., plants. Both cases dealt with discrimination against employes.

In connection with the Niles decision, the board "finds upon the record now before it that as to the four complainants involved, a violation of section 7a of the recovery act by Republic has not been proved and the company is not guilty of such violation."

The labor board recommends, however, that Republic offer an opportunity to three of the complainants to be reinstated in their former positions within 15 days. It also recommended that the fourth employe be reinstated because of the fact that the reasons for which he was laid off do not appear from the evidence to have been adequate.

Complaints Not Upheld

In dealing with the Warren plant, the board finds that eight of the employes' complaints against the company have not been sustained and that the plant has not violated section 7a. The board suggested to the company that it reinstate two employes in their former positions, otherwise their case will be referred to the "complainants' division of the national recovery administration and other agencies of the federal government for appropriate action."

The board also recommended that two of the complaining employes be reinstated because they were old employes and "the reason for their being laid off did not appear from the evidence to have been adequate."

It is noteworthy that in the case of two employes at its Warren plant Republic is found guilty of violating section 7a, but not in the case of other employes at that plant or at Niles.

Safety

PRELIMINARY statistics on industrial accidents in 1934 disclose a 7 per cent increase in occupational fatalities but some comfort in the fact that the increase in all types of accidents was even greater, or 8.7 per cent over 1933.

According to W. H. Cameron, managing director of the National Safety council, Chicago, occupational accidents in 1934 claimed 15,900 lives, or 1000 more than in 1933, whereas motor vehicle deaths rose 13 per cent to 35,500. Accident fatalities of all kinds rose from 91,087 in 1933 to 99,000 in 1934, approximating the all-time record of 99,300 deaths in 1930.

IS SAFEST CEMENT PLANT

Universal Atlas Cement Co.'s Pittsburgh plant won the Portland Cement association safety trophy for the fourth time when on Jan. 1 the plant completed 1335 days of safety, including the complete year 1934, without a disabling injury.

Steel in the News

THE Washington monument, in Washington, having been cleansed and overhauled, the dismantling of the 600 tons of steel tubing forming the scaffolding around it was begun on Jan. 2. It was estimated that it will require three weeks to take down the approximately 50,000 separate sections of pipe and other steel in the scaffolding.

Erection of the scaffold was begun on Aug. 20. While the actual repair work cost only $16,000 to $18,000, the erection, maintenance and demolition of the scaffolding is costing $69,000. Scaffolding and repair firms should note on their ticklers that in 1984 they can look for a similar job.

STEEL MEN JOIN LEAGUE

American Liberty League, Washington, founded by Jouett Shouse to enlighten the country on economic trends and the new deal, lists among new members of its advisory council E. T. Weir, chairman of the National Steel Corp.; George M. Verity, chairman of the American Rolling Mill Co. and Elton Hoyt II, partner of Pickands, Mather & Co.

Production

STEELMAKING continued its upward swing last week, rising 3 points to 45½ per cent. Gains of 2 to 3 points in all the major districts contributed largely to this increase. If present steelmaking schedules are maintained and with the holidays hurdled, it is expected that steelmaking production will rise at an even faster pace than has been the case in the last three to four weeks. Indications point to a further advance this week. Details follow:

Youngstown—Gained 3 points last week to 56 per cent and the rate is likely to rise to 60 per cent at this week's start. Republic Steel Corp. is operating at 100 per cent at its Warren, O., plant, the company's eight open hearths being pushed to provide bars for strip and tin plate mills. Two other producers in the valley are also melting at 100 per cent. Republic resumed melting Jan. 13 in a Lansingville blast furnace, making three active stacks at that point.

Cleveland-Lorain—Up 5 points to 82 per cent, Corrigan, McKinney Steel Co. operating 13 of its 14 open hearths; Otis Steel Co., all eight; and National Tube Co., Lorain, 11 of its 12. National Tube also has lighted a third blast furnace at Lorain.

Pittsburgh—Up 2 points last week to 27 per cent. A gain of 3 points is anticipated this week. This rate is now strongly supported by two

leading interests, in contrast to the smaller independents supporting the rate previously.

Wheeling—Up 4 points to 84 per per cent, with 31 of 37 open-hearth furnaces operating throughout the week. Two large works here are at virtual open-hearth capacity.

Sixteen steelworks blast furnaces are now active, a gain of two. Jones & Laughlin Steel Corp. has blown in a third South Side furnace, making 5 of 11 operating, and Bethlehem Steel Co., at Johnstown, Pa., has blown in a second blast furnace, operating 2 of 7. Other individual rates are unchanged, with Carnegie Steel Co. having 6 of 32 on; National Tube Co., 1 of 4; Pittsburgh Steel Co. and Pittsburgh Crucible Steel Co. each 1 of 2.

Chicago—Advanced 2 points to 49 per cent last week, a new high since last June. Operations have been expanding continuously since late October and a further upturn is seen for this week. Blast furnace schedules are unchanged with 11 of 36 steelworks stacks active.

Gary, Ind—Sheet mills of American Sheet & Tin Plate Co. are operating at approximately 100 per cent. Illinois Steel Co. increased tonnage at its Gary and South Works, and the Gary tin mill is expected to start another nine-turn schedule which will put all plant units in operation.

New England—Held at 68 per cent last week, and will continue at that rate during this week, according to planned steelworks schedules.

Central eastern seaboard—Up 2½ points to approximately 26 per cent, with the increase reflecting in particular improved demand for tin plate. The current week is not expected to bring much change, although the tendency appears upward.

Birmingham—Increased 6 points to 33¼ per cent last week. Tennessee Coal, Iron & Railroad Co. will have five open-hearth furnaces in production this week. Sheet mills continue in fairly steady operation.

Buffalo—Held at 39 per cent last week, with 15 out of 38 open hearths in operation, and this rate is scheduled to hold this week.

Detroit—Stationary at 59 per cent last week, one producer still continuing with all eight furnaces on and the other melting in two.

December Ingot Output up 22 Per Cent, Best Month Since June; Year's Gain 11.8

PRODUCTION of steel ingots in December, 1934, gained 22 per cent over that of November, rising from 1,589,049 gross tons in November to 1,941,127 tons in December, according to statistics of the American Iron and Steel institute. The daily rate of production rose 27 per cent, from 61,117 gross tons in November to 77,645 tons in December. The operating percentage increased from 27.76 to 35.26. December developed the highest daily average rate of production and per cent of operation since the month of June.

Total production for 1934 was 25,260,570 gross tons, compared with 22,594,079 tons in 1933, an increase of 11.8 per cent. The daily average rate increased from 72,884 tons in 1933 to 81,224 tons in 1934; the percentage of operation from 33.53 to 36.89.

The peak of production in 1934 was in May, with a daily average output of 124,174 gross tons; the lowest was in September with 50,065 tons per day.

Gross Tons

97.82 Per Cent of the Industry Reporting

1933	Open-Hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	No. of working days	Approx. daily output all companies	Per cent operation
Jan.	885,663	109,000	994,663	1,016,870	26	39,110	17.99
Feb.	992,798	126,781	1,049,579	1,073,012	24	44,709	20.57
Mar.	784,111	94,509	878,620	898,236	27	33,268	15.30
Apr.	1,180,823	135,217	1,316,040	1,345,422	25	53,817	24.76
May	1,176,425	216,841	1,933,266	1,976,428	27	73,201	33.68
June	2,211,652	296,765	2,508,417	2,564,420	26	98,632	45.37
July	2,743,326	355,836	3,099,162	3,168,354	25	126,734	58.30
Aug.	2,430,663	370,370	2,801,033	2,863,569	27	106,058	48.79
Sept.	1,991,204	242,014	2,233,218	2,283,079	26	87,811	40.40
Oct.	1,847,690	191,673	2,039,363	2,084,894	26	80,188	36.89
Nov.	1,331,029	156,939	1,487,968	1,521,189	26	58,507	26.92
Dec.	1,629,495	129,834	1,759,329	1,798,606	25	71,944	33.19
Total	19,674,879	2,425,779	22,100,658	22,594,079	310	72,884	33.53

99.39 Per Cent of the Industry Reporting

1934							
Jan.	1,786,467	172,489	1,958,956	1,970,979	27	72,999	33.15
Feb.	1,993,638	175,873	2,169,511	2,182,826	24	90,951	41.31
Mar.	2,540,143	203,904	2,744,047	2,760,888	27	102,255	46.44
Apr.	2,622,372	257,482	2,879,854	2,897,529	25	115,901	52.64
May	3,000,624	331,620	3,332,244	3,352,695	27	124,174	56.39
June	2,714,983	282,592	2,997,575	3,015,972	26	115,999	52.68
July	1,343,732	119,869	1,463,601	1,472,584	25	58,903	26.75
Aug.	1,245,445	109,598	1,355,043	1,363,359	27	50,495	22.93
Sept.	1,126,415	117,580	1,243,995	1,251,630	25	50,065	22.74
Oct.	1,325,225	127,789	1,453,014	1,461,932	27	54,146	24.59
Nov.	1,447,297	132,059	1,579,356	1,589,049	26	61,117	27.76
Dec.	1,797,830	131,456	1,929,286	1,941,127	25	77,645	35.26
Total	22,944,171	2,162,311	25,106,482	25,260,570	311	81,224	36.89

Crucible and electric ingots not included. Percentages of operation for 1933 based on ingot capacity of 67,386,130 tons as of Dec. 31, 1932. Percentages for 1934 based on ingot capacity of 68,478,813 tons as of Dec. 31, 1933.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)
(Tons)

	1934	1933	1932	1931
Jan.	231,777	285,138	426,271	800,031
Feb.	385,500	275,929	413,001	762,522
March	588,209	256,793	388,579	907,251
April	643,009	335,321	395,091	878,558
May	745,063	455,302	338,202	764,178
June	985,337	603,937	324,746	653,104
July	369,938	701,322	272,448	593,900
Aug.	378,023	668,155	291,688	573,372
Sept.	370,306	575,161	316,019	486,923
Oct.	343,962	572,897	310,007	476,032
Nov.	366,119	430,358	275,594	435,697
Dec.	418,630	600,639	227,576	351,211
Yrl. adj.		44,283	5,160	6,040
Total	5,925,873	5,805,235	3,974,062	7,676,744

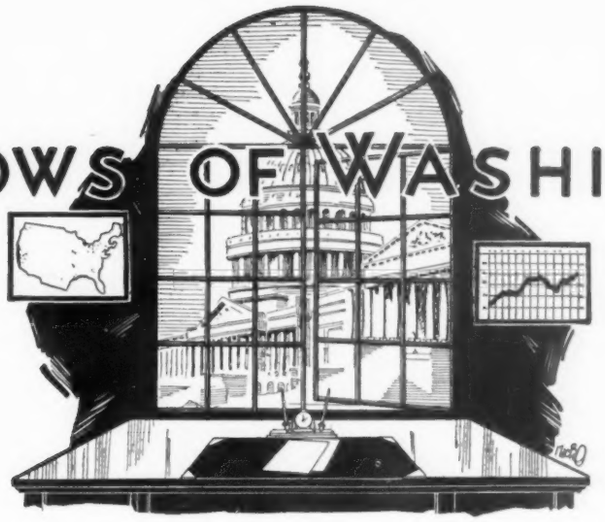
STEEL CORP. SHIPMENTS UP

Shipments of steel by the United States Steel Corp. is December were 418,630 tons, a gain of 52,511 tons over the 366,119 tons shipped in November. Total shipments for 1934, subject to yearly adjustment not yet announced, were 5,925,873 tons. This compares with 5,805,235 tons for 1933. Other comparisons are found in the table above.

LONG-IDLE FURNACE RESUMES

Detroit Steel Casting Co., Detroit, has relighted a 20-ton open-hearth furnace, pouring the first steel since June 2, 1931. During the past 3½ years the company has been supplying its steel from its electric furnace, increased demand recently necessitating the starting up of the larger unit.

WINDOWS OF WASHINGTON



WASHINGTON

THE power of mind over matter was demonstrated again last week when the quiet deliberations of nine black-robed justices in the Supreme Court wing stilled the clamor of 531 senators and representatives at both ends of the Capitol.

In delegating to the President the authority, in the recovery act, to issue executive orders controlling interstate shipments of "hot" oil congress violated the constitution in that it did not accompany this abdication with needed standards or indications of its intent, the Supreme Court ruled.

Concluding this finding, which is the most outstanding one upsetting any phase of the new deal, the court proceeded to hear arguments in the case involving the right of the government to abrogate gold clauses in bonds.

The more the court's ruling on section 9c of the recovery act is studied, the more patent it becomes that directly the status of NRA and the codes enacted under it, including that on iron and steel, is not affected.

TOMATO JUICE FOR CONGRESS

Donald Richberg, chief co-ordinator for the President, apparently is correct and within his jurisdiction in stating that the decision has no bearing on codes and any tendency toward loosening-up is unwarranted.

It is a fact, too, that for months prior to passage of the recovery act in June, 1933, the conservative elements of the oil industry and the government were considering means of co-operating with the states in curbing interstate commerce in "hot" oil, and the recovery act appeared to be a happy vehicle for it.

But—the decision has visibly shaken congress. It has served notce that careless delegaton of power to governmental agencies to issue what has the effect and intent of law must stop. It has the same sobering effect that the visit of a father with one son to the woodshed has on the rest of the children.

The attitude of a majority in both houses that extension of the recovery act or the passage of a mandatory 30-hour work week or other legislation of broad scope can be effected flippantly has cooled off considerably. The zeal of the new dealers has been tempered.

The court's ruling is the more noteworthy because the vote was 8 to 1 against section 9c, with the conservatives on the long end, whereas previous decisions have been 5 to 4 on the liberal side.

STEEL CODE UNSCATHED

The recent questioning by Justices Hughes and Brandeis, disclosing that upward of 10,000 pages of orders have been issued by 60 different agencies, having the effect of law and without being officially recorded, indicates that the emergency must be stretched to its elastic limits to obtain court sanction.

Directly, the status of the iron and steel code has not been affected by the decision. Barring a decision by the industry to throw up the code because of the labor conflicts that have been precipitated by the steel labor relations board, it appears that the tenure of the steel code will be the tenure of NRA.

The second vital issue which was argued last week before the Supreme Court—the gold-clause case—presents an unusual conflict of judgment with expediency. To any business man of standing the abrogation of the gold-payment clause is as repugnant as the repudiation of an essential part of any contract. Yet, should the high court rule that bond payments must be made in the present equivalent of gold, the deflation of the dollar to 59 cents would almost double sums paid out.

In the case of the government, a reversal by the court would practically double interest payments on bonds and throw the budget much more seriously out of balance. The guessing in Washington is that the decision will be a customary 5 to 4 one sustaining the government's policy.

DECISION WISELY TIMED

It may have been more than coincidence that the Supreme Court's decision in the oil production case was handed down four days after congress convened. For one thing, the court has given congress a guide on legislation required at this session and it has warned that it cannot carelessly delegate its lawmaking powers even to the President without setting up approved standards and indications of policy.

Sentimentally, the decision is a serious blow not only to NRA but also to all new deal recovery agencies. The tendency to bypass codes will be accelerated. Another effect, which may be helpful, will be to make congress consider new legislation more carefully and be less inclined to pass any kind of measure under the guise of "an emergency."

WHETHER the President's proposed shift from the dole to work relief as a matter of mitigating unemployment is a boon or a boomerang to iron and steel is another conflict between judgment and expediency.

On the one hand, the actual outlay, to be paid ultimately in taxes, will be greater in work relief than in a mere dole. On the other, the elimination of grade crossings, further loans to the railroads for equipment, the undertaking of even vaster building programs, will develop a much broader market for iron, steel and equipment made of both materials.

The apparent about-face of business on the dole, preferring it at this time whereas it condemned it a year ago, is understandable if the long view is taken.

The logic is that ultimately re-

covery can be effected only by re-employment, such re-employment can flow only from a return of confidence to investors, and so long as the budget is out of balance by practically $4,000,000,000, and the public debt shoots up almost to the $35,000,000,000 mark, such required confidence cannot be generated.

In Washington, there is less mention of the dangers of a national debt approximating $35,000,000,000 and more uncertainty over the length of time the budget will remain unbalanced. It is being said that this is easily a 35 billion dollar country—perhaps a 40 billion one, but it cannot stand the uncertainty of continuing deficits.

It doesn't take the seventh son of a seventh son to detect some substantial uneasiness underlying the new deal. If unemployment should continue on a large scale through 1935 and into 1936, the tremendous personal popularity of the President could easily vanish as rapidly as it accumulated.

The danger to industry then would be a possible disposition of new dealers to completely upset the apple cart and take a chance on some salvage in the ensuing political and economic wreckage.

IN A BRIEF which counsel for Weirton Steel Co. filed Dec. 29 at Wilmington, Del., in the case growing out of the employe election in December, 1933, is raised an issue which may become crucial in a number of matters affecting iron and steel. This issue is the intrastate character of the production of iron and steel.

The contention of Weirton is that the raw materials utilized at its plant at Weirton, W. Va., such as iron ore, coke, limestone, etc., actually come to rest there and if they have been in interstate commerce, for the time being at least they cease to be. The process of manufacture, therefore, begins after the materials come to rest and is entirely an intrastate one.

BLOW TO NATIONAL BOARDS

If sustained, this view of course would radically curb the jurisdiction of the steel labor relations board. It would apply also to the elections ordered in the past week at certain plants of the Carnegie Steel Co., Illinois Steel Co. and Youngstown Sheet & Tube Co.

It will be recalled that when the supreme court of the District of Columbia knocked out the railroad labor pension act, which was slipped over in the closing days of the last congress, it ruled in the test case of the Long Island railroad that many of the employes of this railroad were engaged entirely in intrastate commerce.

Carrying the argument to its conclusion, there is the possibility that unemployment insurance, old age pensions and other phases of new deal social legislation might be placed in jeopardy on the grounds the production of iron and steel is an intrastate matter and hence outside the purview of the federal government.

An interesting complication arises from the fact that under the iron and steel code producers must quote prices delivered at the consumer's plant. In the past, iron and steel products have usually been sold f.o.b. mill.

Whether under the steel code the products of a steelworks become the property of the buyer when they are loaded in cars at the producer's works or whether they remain the property of the producer until delivered at the buyers plant may be an issue for lawyers to determine.

Certainly there appears to be abundant other opinion that the movement of raw materials to a steelworks is one distinct phase, their conversion into finished products a second phase, and their delivery to the user a third one.

SUPREME Court decisions, the President's message, the budget and other legislative matters have drowned out much of the publicity emanating from new deal additions to the government.

Housing is one of the activities that appears to have subsided, but it is only through contrast with the increased din on Capitol Hill. Those industries which see in the federal housing administration the greatest possibility of any alphabetical agency continue to work quietly in anticipation of a spring upturn in building.

NEW CONCEPT OF STEEL HOUSE

Within ten days or two weeks, one of the largest steel companies will launch a project in Washington utilizing a new application of steel in the framing of low-cost dwellings. These will not be steel houses in the strict sense of the word; they will employ steel generously in the interior and utilize orthodox materials for the exteriors and thus reduce buying resistance.

For these houses, formed and welded sheets and strip will be substituted for scantlings, floor joists and many other uses of wood in the interior. It is possible that a prefabricated section of wall between the bathroom and kitchen will carry most of the plumbing which will be installed at the factory.

A pre-fabricated housing project is going forward with the organization of the Earley Process Corp. with headquarters in the National Press building, Washington, a studio at 2131 G street, N. W., and a plant at Rosslyn, Va., a suburb of Washington.

This corporation, named after John J. Earley, inventor of a process for fabricating concrete panels, reinforced with mesh at the factory, is putting the finishing touches on the first house to be built with pre-cast panels, (see STEEL, Dec. 3, p. 19) in the environs of Washington.

Of this corporation, Mr. Earley is president, Basil G. Taylor is vice president, and Oswald P. Schuette, a Washington newspaper man with an international reputation as a war correspondent and political writer, who has won distinction by an anti-monopoly campaign in the field of radio and copyright and who organized independent fabricators of aluminum, is secretary-treasurer.

In the experimental work done by the Earley corporation, wood was used for the interior framing only because desired sections in steel were not available. At least one large steel corporation has been co-operating in the design of lighter pre-fabricated sections for this purpose.

Chemists Revise Ethics

Association of Consulting Chemists and Chemical Engineers Inc., 50 West Forty-first street, New York, formed in 1928 to promote the interest of those of the chemical profession engaged in independent consulting and analytical practice, has revised its code of ethics.

Among other things, the organization is protecting independent consultants and private laboratories from encroachments by government bureaus, universities and other institutions supported by public funds. Product certification is being studied by the association to determine what form of control is necessary for its healthy development.

Thomas A. Wright, of Lucius Pitkin Inc., is president of the association.

Steel Merger Rumored

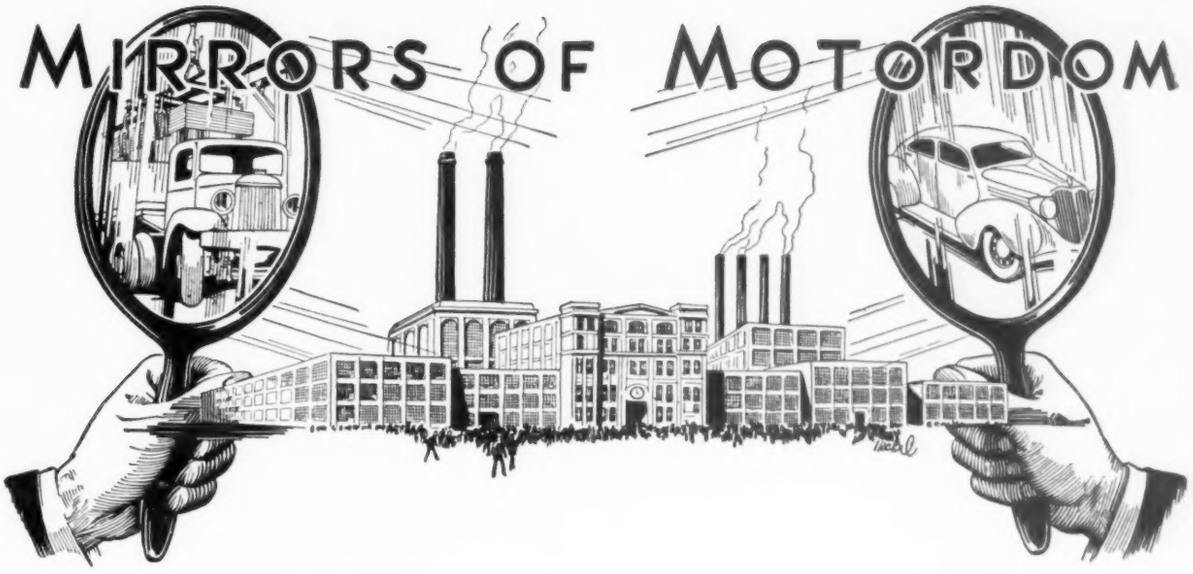
Reports of a nearby merger of two large Middle West steel companies were current in financial circles last week, but not confirmed.

Correction

The caption accompanying the graphic presentation of STEEL's per capita consumption of steel analysis in the issue of Jan. 7, page 140, erroneously states that each ingot mold represents 50 tons. This should read 50 pounds. Sorry.

Colorado's Mineral Output

In 1934 Colorado produced molybdenum valued at $9,000,000; lead, $308,000; zinc, $112,000; copper, $217,000; gold, $12,094,000; silver, $900,900; coal, $14,735,000; and other mine products $6,225,000, a total of $43,591,000.



DETROIT

SOMETHING approaching a more even acceleration in production has been attained by most of the leading automobile manufacturers following several weeks of rushed activities which had suppliers of steel and other materials feverishly attempting to satisfy an abrupt and broad increase in consumption.

Pressure for delivery continues insistent, but the flow of steel has become attuned to the heavier requirements, and steel sellers have an opportunity at last to catch their second wind.

Further gains were made in assemblies last week—the first in three not handicapped by a holiday interruption—as producers sought to attain schedules which, if realized, will make the month's output the best for January in five years.

BACK TO 1930 LEVELS

Since it is unlikely that some will reach projected goals, the hoped-for peak of 300,000 this month may not be scaled, but the 200,000 mark should be topped comfortably. The last time production exceeded 200,000 here and in Canada was in 1930, with 283,606 units. Last year the total was 156,907 and in 1929, the all-time record, it was 422,538.

Ford, off to a good start, is aiming at 5000 cars and trucks daily, and for some time has been receiving and manufacturing certain parts on that basis preparatory to boosting assemblies to the same level. Chevrolet, trailing Ford in production by nearly 50 per cent for several weeks, is gaining. Plymouth assemblies have increased further, aided by the addition of a night shift.

Both Plymouth and Ford show a considerable advantage to date in new model production over Chevrolet, whose dealers recently have been somewhat embarrassed by the lack of 1935 master series cars to show prospective buyers.

Last week when new Fords and Plymouths were commencing to dot the streets, Chevrolet dealers had to display illustrations of master models, having on hand only the standard cars which, in appearance, reveal no important changes from their 1934 predecessors. This shortage should commence to be relieved this week, though heavy production of the master series is not looked for until later this month.

Motor car builders apparently are taking their cue from the trend of retail sales in November and December in attempting to gage probable sales and necessary production for coming months.

November registrations were the highest for that month since 1929, while preliminary reports for December indicate it was the best twelfth month in at least several years.

Dealers' stocks of old models were cleaned out unusually well, a situation helping to swell initial orders of 1935 cars.

There is the suggestion that fear of labor trouble in the near future in the automobile or steel industry also prompts manufacturers to rush assemblies at this time, but the general view is that Washington could ill afford to permit such interference with rising activity in the two bulwarks of industry, and that recent gains in motor car production are predicated almost wholly on the sales outlook.

REALIGNMENTS IN PRICES

Announcements of new model prices last week showed only minor changes from comparable 1934 cars, but introduction of additional series not built last year causes a tightening of competition in certain price fields.

The lineup in the lowest market remains essentially the same, Chevrolet countering Ford's price revisions with $10 cuts on the coupe, coach and phaeton in the standard models and leaving the master prices unchanged. Chevrolet now undersells Ford $20 to $25 on standard models but is at the same level or $5 higher on deluxe cars.

Plymouth competes closely with Chevrolet and Ford in the latters' deluxe coupes and four-door sedans, but is $35 to $40 higher on the two-door sedan.

Following is the price setup on two-door sedan models below $700:

Chevrolet	$485
Ford	510
Ford (Deluxe)	575
Chevrolet (Master)	580
Terraplane	595

Automobile Production

Passenger Cars and Trucks—U. S. Only

By Department of Commerce

	1932	1933	1934
Jan.	119,344	128,825	156,907
Feb.	117,418	105,447	231,707
March	118,959	115,272	331,263
April	148,326	176,432	354,745
May	184,295	214,411	331,652
June	183,106	249,727	308,065
July	109,143	229,357	266,576
Aug.	90,325	232,855	234,810
Sept.	84,150	191,800	168,171
Oct.	48,702	134,683	132,491
Nov.	59,557	60,683	78,415
Dec.	107,353	80,565	.....
Year	1,370,678	1,920,057	2,595,502*

*11 Months.

Estimated by *Cram's Reports*

Week Ended	
Jan. 5	42,003
Jan. 12	59,725

Graham	595
Plymouth	615
Lafayette	620
Terraplane (Deluxe)	645
Plymouth (Deluxe)	650
Pontiac (Standard Six)	665
Dodge	690

Prices of the new Willys begin at $395, but only the coupe and four-door sedan are offered.

General Motors has added two new lines in the $1000-and-less class, the Pontiac standard and deluxe six, thereby bridging the gap formerly existing between the Chevrolet master and Oldsmobile six and giving the leading interest eight different series in this field, against six in 1934.

Chrysler also adds two new series with the DeSoto six and Chrysler eight airstreams, and now has six different lines priced at less than $1000.

Chevrolet hopes to interest the buyer concerned with lowest initial cost and economy of operation as well as the one interested in refinements. While knee-action is available on the master models, $20 extra will be charged for this feature and the company expects that 90 per cent of buyers will pay the surcharge and take the coil springs.

Improvements in the standard Chevrolet are confined principally to mechanical features, including 23 per cent increase in engine horsepower, and changes in design of frame, clutch and steering gear. Wheelbase of 107 inches compares with 113 inches for the master, an increase of 1 inch over last year for the latter.

PACKARD SPURS COMPETITION

Packard's new 120 series causes much speculation as to the effect it will have on sales of such makes as Buick, Chrysler, Hupmobile, Nash and Studebaker in the $1000 price class. With a high radiator and 120-inch wheelbase the new Packard has a big-car appearance and makes an impressive showing under price tags of $980 to $1095. Material releases for 15,000 units have been issued and production of parts is under way, but deliveries will be deferred until March.

Packard uses independent front wheel suspension with coil springs on the 120 models, the arrangement being described as an improved development from ten existing types. Torque arms extend from the center of the front cross member to lower ends of the front wheel king pins and hold the front wheels in alignment as well as absorb braking torque. Shock absorber arms extend from the frame to the top of the king pin carriers. A feature of the X member of the frame is that the arms, instead of ending at the frame, extend all the way forward and backward over the kickup for the rear axle.

The new Packard is being offered at what appears to be a propitious period, when better demand in the medium price field is anticipated and when more individuals are attaining a position which enables them to purchase cars with an eye to prestige as well as to transportation alone.

Buick, with all but its 40 series priced above the Packard-120, and with 1935 models unchanged in appearance, might be expected to suffer somewhat from this new competition, but will be able to counter with new designs this spring or summer.

From the appearance standpoint the industry is credited with having done the best job in its history in treatment of rear ends of new models. In the majority of instances spare tires and gasoline tanks have disappeared, incidentally marking a loss in steel consumption in manufacture of metal tire covers.

LICK STAMPING TROUBLES

General Motors cars offset this, however, by greater steel use for the turret top sheet covering and interior steel bracing of the body roof. Only occasional die trouble is reported to have resulted from the more difficult draws involved in streamlining of fenders and bodies of new cars.

A softer clutch is a talking point frequently heard in connection with 1935 models. When the car is operating, clutch pressure is raised by means of centrifugal weights which exert increasingly greater force as the speed increases and which reinforce the action of the springs.

Willys-Overland again has entered the economy field with a four-cylinder car in sedan, coupe and delivery truck models. Horsepower is 48, while overall length is 155 inches. Austin passenger models are confined to a business coupe at $295, a standard coupe at $345 and a deluxe coupe at $365.

Graham's new entry in the lowest price market, a 60-horsepower six, resembles in appearance the larger six and eights also offered by this company, and is available in two-door and four-door sedan models. Semi-elliptic springs used have a combined length equal to 80 per cent of the car's wheelbase.

Roy D. Chapin on Jan. 6 observed the twenty-fifth anniversary of his election as president of the Hudson Motor Car Co., completing a period of service unique for an industry in which executive changes have been rather frequent. Mr. Chapin received his first job from R. E. Olds when the latter was head of the Oldsmobile company, and later conceived the idea of forming his own company. Hudson Motor Car Co. was incorporated on Feb. 24, 1909, with a capital of less than $100,000, and since that time has earned net profits of more than $93,000,000.

Died:

DAVID R. BOWEN, 69, vice president of Farrel-Birmingham Co. Inc., Ansonia, Conn., and for 45 years chief engineer of this company, at his home in Ansonia, Dec. 29. Born in Wales, he came to this country at the age of 17 and worked as a machinist's appretice for Farrell Foundry & Machine Co. Within ten years he had become chief engineer, and in 1930 was named vice president in charge of engineering.

□ □ □

Harvey J. Fornelius, 56, superintendent of the Athenia Steel Co., Clifton, N. J., in that city, Jan. 4.

□ □ □

Walter O. Krebs, 29, research engineer with the Youngstown Sheet & Tube Co., Youngstown, O., in that city, Jan. 8.

□ □ □

Luther Frost, 59, a pioneer in the automobile manufacturing business, at his home in Greenfield, Ind., recently.

□ □ □

Henry S. Wilcox, 72, from 1913 until his retirement ten years ago, president of the Troy Laundry Machinery Co., New York, in Lakeville, Conn.

□ □ □

William W. Lukens, 65, former president of the Alan Wood Iron & Steel Co., Philadelphia, at his home in Conshohocken, Pa., Jan. 5.

□ □ □

Hiram F. Harris, 48, industrial engineer and formerly president and general manager of the Bethlehem Motors Corp., Allentown, Pa., at his home in New York, Jan. 6.

□ □ □

Joseph A. Mackell, 60, for the past 22 years associated with the Pittsburgh Rolls Corp., Pittsburgh, latterly in sales work, at his home near Harrisville, Pa., Jan. 4.

□ □ □

Robert P. Smith, 62, works manager of the axle division of Eaton Mfg. Co., Cleveland, and nationally known automotive engineer, at his home in Cleveland, Jan. 6.

□ □ □

Harry M. Doubleday, 79, for 16 years president of the Doubleday Hill Electric Supply Co., Pittsburgh, and an early associate of Thomas A. Edison, in Lyons, N. Y., recently.

□ □ □

G. M. Bond, 83, expert on standardization of measurements and designer of the Bond standard measuring machine for the reproduction of gages, in Hartford, Conn., Jan. 6.

□ □ □

John R. Lee, 58, vice president of the Fargo division of the Chrysler Corp., Detroit, and formerly president

(*Please turn to Page* 18)

Industrial Men in the Day's News

I. C. SWEITZER has been named assistant comptroller of the Republic Steel Corp., Youngstown, O., by the new comptroller, Pearce F. Boyer. Mr. Sweitzer was employed in the treasurer's department of Central Alloy Steel Corp. from 1915 to 1930, when the company was absorbed by Republic.

W. B. Knuff has been appointed works auditor of the corporation. Until 1930 he was chief cost accountant for Central Alloy, and has had previous experience with the United States Steel Corp. and Corrigan, McKinney Steel Co.

Ernest Koenig has been named chief engineer of the Youngstown district for Republic. He has had wide experience in the steel industry, having been associated with Colorado Fuel & Iron Co., Youngstown Sheet & Tube Co., and the Ohio works of Carnegie Steel Co. He spent two years in Russia as a representative of the Freyn Engineering Co., Chicago, assisting in the construction of blast furnaces there.

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Jay Waldeck, for many years associated with the American Steel & Wire Co., Cleveland, and its predecessor the Cleveland Rolling Mill Co., and recently employed on special duties with Steel & Wire and the Columbia Steel Co., both subsidiaries of the United States Steel Corp., retired Jan. 1 under the Steel corporation's pension plan. Mr. Waldeck has had wide experience in production of drawn wire and cold-rolled strip, and during his years of service he has held positions of plant superintendent or higher office in every district of Steel & Wire, including the Pacific coast. At one time he was assistant general manager of operations of the entire company.

Robert F. McCloskey

Who as noted in STEEL for Dec. 24 has been elected vice president and a director of Blaw-Knox Co., Blawnox, Pa., Pittsburgh district

On the occasion of his retirement, he was tendered a testimonial dinner at the Union club, Cleveland, Jan. 3, attended by a number of his associates, including C. F. Blackmer, president of the company, and J. A. Coakley, traffic manager of the Steel corporation.

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George W. Thornburg, Crescent Park Brass Foundry, Waltham, Mass., has been elected president of the New England Foundrymen's association. Other elections include: Vice president, A. S. Wright, Hunt-Spiller Mfg. Co., Boston; treasurer, Arthur W. Gibby, Gibby Foundry Co., East Boston; and secretary, Ernest F. Stockwell, Barbour, Stockwell Co., Cambridge. The latter succeeds his father, the late Fred F. Stockwell, who served as secretary of the association for many years.

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W. G. Butler, formerly affiliated with the American Motor Body Co., Philadelphia, has been appointed traffic manager of the Philadelphia office of the Charles Dreifus Co., dealer in iron and steel scrap.

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William L. Hoge, president of the Mengel Body Co. and vice president of the Mengel Co., Louisville, Ky., has been elected president of the company, to succeed the late Col. C. C. Mengel, head of the company since 1877.

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Col. E. A. Deeds, of New York and Dayton, O., has been elected a director of the American Rolling Mill Co., Middletown, O., succeeding the late James P. Orr of Cincinnati. Colonel Deeds is chairman of the board of the

C. H. H. Weikel, Manager, Commercial Research and Industrial Development Department, Bethlehem Steel Co.

He has been associated with the steel industry for over 20 years, in a number of departments.

After service in the army during the war he returned to take up accounting work for Bethlehem.

In recent years he has been active in the legal and sales divisions, concentrating on market extension.

C. H. WEIKEL has been appointed manager of the commercial research and industrial development department of Bethlehem Steel Co., Bethlehem, Pa.

Associated with the steel industry since 1912, he started his business career with the frog and switch department of the Pennsylvania Steel Co. at Steelton, Pa., an organization which subsequently became a part of Bethlehem.

He continued at Steelton, with experience in the steel foundry, maintenance and order departments until the World war, during which he served over two years in the army.

Following the war, he joined the accounting department at Bethlehem in 1919 and six years later became associated with the legal department, with special duties in respect to development and research.

He has been associated with the sales division since 1930, where he has given particular attention to industrial planning and market extension problems.

National Cash Register Co., and is interested in the General Machinery Corp., which has plants in Hamilton, O.

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E. Muehl, recently associated with the Ford Motor Co., Detroit, is now plant manager for the Briggs Mfg. Co., Wyandotte, Mich.

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John W. MacMorris, long identified with the operating departments of S. K. F. Industries, New York, has been appointed plant manager of the Roller Bearing Corp. of America, Trenton, N. J.

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E. G. Allen, Cleveland, has been named to the sales staff of the Certified Core Oil & Mfg. Co., Chicago. For 17 years previous he was associated with Spencer Kellogg & Sons Co.

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Paul W. Rhame has been appointed assistant manufacturing manager of the AC Spark Plug Co., Flint, Mich., subsidiary of General Motors Corp. Sydney N. Lyttle has been named chief inspector.

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Louis J. Borinstein, Indianapolis scrap dealer, has been re-elected president of the Indianapolis chamber of commerce for a fifth term. He is a member of the board of directors of the Institute of Scrap Iron and Steel.

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Lewis B. Lindermuth, consulting engineer, 405 Lexington avenue, New York, recently returned from England, will leave for Australia Jan. 15 to visit the plant of the Broken Hill Proprietary Co. Ltd., Newcastle, New South Wales.

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Edwin F. Cone, at one time associate editor of *The Iron Age*, New York, and lately active in special work for the Bethlehem Steel Co., Bethlehem, Pa., has been appointed editor of *Metals and Alloys*, monthly publication of the Reinhold Publishing Corp., New York.

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W. J. Bach, 1400 Tenth place south, Birmingham, Ala., has been appointed southern sales representative of the Cleveland Quarries Co., Cleveland, for the distribution of silica, fire stone and kindred products in Tennessee, Georgia, Florida, Alabama, Mississippi, and Louisiana.

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A. B. Jacobus, for the past several years manager of general scale sales in the Chicago office of Fairbanks, Morse & Co., has been made general manager of E. & T. Fairbanks & Co., St. Johnsbury, Vt., a subsidiary of Fairbanks, Morse.

George C. Worthley, formerly manager of the scale department in the New York branch, succeeds Mr. Jacobus.

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Wilbur F. Burt, formerly vice chairman of the manufacturing committee, has been appointed chairman of the manufacturing committee of the Socony-Vacuum Oil Co., New York, succeeding Charles W. Hadley.

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G. Rudolph Brandin has been appointed general sales manager of the Watson Mfg. Co., Jamestown, N. Y., manufacturer of metal specialties. Formerly manager of the Los Angeles plant of the Dahlstrom Metallic Door Co., he succeeds M. C. Windrum in his new position.

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John H. Vohr has been appointed superintendent of the new continuous hot wide strip mill of Youngstown Sheet & Tube Co., Youngstown, O. At one time master mechanic for the American Sheet & Tin Plate Co., more recently he was assistant superintendent of the strip mill at Inland Steel Co.'s Chicago district plant.

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Harry L. Barr, for the past 20 years active in sales and manufacture of electrical sheet steel, has been placed in charge of electrical sheet sales for the Granite City Steel Co., Granite City, Ill. Recently he has been associated with Newton Steel Co., Monroe, Mich., and prior to that with Follanshee Bros. Co., Follansbee, W. Va.

Died:

(*Concluded from Page* 16)

of John R. Keim Mills Inc., Buffalo, manufacturer of pressed steel parts, in Ferndale, Mich., Jan. 6. In 1927 he was vice president and general sales manager of Dodge Bros. Corp.

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George E. Batten, 47, San Francisco manager for the Ludlum Steel Co., Watervliet, N. Y., in San Francisco, Jan. 1. A native of California, he had been branch manager for Ludlum since 1924.

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Frank J. Ottis, part owner of the Northern Malleable Iron Co., St. Paul, and active in civic and political affairs there, in that city, Jan. 5. During the war he represented the malleable iron industry in its contacts with the war industries board.

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F. H. Ehly, 62, purchasing agent for the American Bridge Co. at Pencoyd, Pa., at his home in Roxborough, Pa., Jan. 5, following a short illness. He had been affiliated with the Pencoyd organization for 40 years.

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Thomas G. Cranwell, 72, former president and co-founder of the Continental Can Co. Inc., New York, in Atlantic City, N. J., Jan. 9. He had been in ill health for 10 years. In 1904 he helped organize Continental Can and served as president from that time until 1927 when he became chairman of the board. He resigned in 1930, but remained a director.

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Warren F. Perry, 67, executive secretary of the Ohio Manufacturers' association and for many years a works official in Mahoning valley steel mills, at Cleveland clinic hospital, Jan. 8. In 1900 he joined the Carnegie Steel Co. at Youngstown, O., and became assistant to the district superintendent. In later years he was associated with other steel companies in the district.

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Clarence J. Harter, 55, head of the Harter Educational & Engineering Service, Worcester, Mass., in West Boylston, Mass., Jan. 7. He had been associated with the following organizations in engineering and purchasing capacities previous to founding his own firm: Remington Arms Co., Bridgeport, Conn.; Pratt & Whitney Co., Hartford, Conn.; Bilton Machine Tool Co., Bridgeport; H. H. Franklin Co., the Norton Co. and Reed-Prentice & Co., the last three at Worcester.

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Alba B. Johnson, 76, chairman of the Southwark Foundry & Machine Co., Philadelphia, and former president of the Baldwin Locomotive Works, Eddystone, Pa., at his home in Rosemont, suburb of Philadelphia, Jan. 8. Active in many business, civic and social endeavors, he was president of the Pennsylvania state chamber of commerce; vice president of the Philadelphia chamber of commerce, of which he was formerly head, and a past president of the American Manufacturers Export association.

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Henry L. Jones, 64, for 28 years mechanical engineer and foreign agent, United States Steel Products Co., New York, in a New York hospital, Jan. 6. He had been employed for 44 years by subsidiaries of the United States Steel Corp., having first served for 16 years as an engineer with the American Bridge Co., at Sydney, Australia. As representative of United States Steel Products he was active in the development of its foreign trade and traveled extensively in Europe and South America.

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Louis J. Campbell, only son of the late James A. Campbell, founder of the Youngstown Sheet & Tube Co., at a Youngstown, O., hospital, Jan. 6, after a lengthy illness. Following his graduation from Yale in 1910, he became assistant to his father and later was named treasurer of the company. He served in the war, returned and became vice president of Sheet & Tube, resigning in 1930 to organize the Electric Alloy Steel Co. in Dunkirk, N. Y., now defunct.

EDITORIAL

Gains in 1935 Were Largely Traceable to Federal Aid

STATISTICS on production, rate of operations and distribution of finished products for the steel industry in 1934 reflect the effect of government influence to a greater extent than in any previous year.

The total output of steel ingots, according to the American Iron and Steel institute, was 25,260,570 tons, an increase of 2,372,999 tons or 10.4 per cent over the 22,887,571 tons in 1933.

On the basis of the figures reported to STEEL for its annual compilation of the distribution of finished rolled steel, it is apparent that all but two of the principal forms of rolled steel shared in this increase. Rails, track accessories, plates, structural shapes, bars, sheets, strip, pipe and tubing and unclassified finished rolled steel products were produced in greater volume in 1934 than in 1933.

Comparisons of the production reported to STEEL for the two years are as follows:

	1933 Gross Tons	1934 Gross Tons	Increase Per cent
Rails, heavy and light	408,206	1,007,746	147
Angle bars, steel ties and other track accessories	220,532	377,146	71
Plates	1,008,418	1,178,666	17
Structural shapes	738,887	1,048,077	42
Bars, except concrete	2,113,426	2,189,248	3
Bars, concrete	310,523	401,986	29
Hoops, bands, narrow flats, etc.*	228,407*	.....	....
Black plate for tinning	1,745,337	1,418,182	19†
All other black plate and sheets, except galvanized	2,198,905	2,496,317	14
Galvanized sheets	648,347	780,709	20
Strip steel	1,504,608	1,907,194	27
Tubing and pipe	1,041,940	1,565,524	50
Wire products	1,385,833	1,254,060	9†
All other finished rolled products	189,752	245,841	29

*This classification discontinued under steel code.

†Decrease.

In most of the cases in which the production of finished rolled steel was higher in 1934 than in 1933, it is evident that part of the increase must be attributed to the result of government financing. This is particularly true of steel rails and track accessories. Of the reported increase of about 600,000 tons of rails, 424,746 tons is accounted for by purchases involving government financial aid. About $8,000,000 worth of the increase of 150,000 tons of track accessories was bought with federal funds.

Likewise, the influence of government activity was a big factor in the increased consumption of plates, shapes, bars, tubes, etc. for railroad cars and locomotives. PWA, up to Sept. 1, had loaned more than $80,000,000 for the purchase of railroad cars and locomotives. Car orders in 1934 totaled 24,000 as compared with only 2460 in 1933. This increase is reflected in STEEL's distribution figures. The reported consumption for cars and locomotives was as follows:

	1933	1934
Plates	147,169	222,173
Structural shapes	34,498	91,822
Bars	112,864	146,185
Tubing and pipe	16,696	30,190

Similar examples of increased demand traceable directly or indirectly to government influences are numerous. For instance, the greater buying power of the farmers, due in large measure to their receipt of bonuses from the government under AAA, is reflected in the consumption of bars for agricultural use. In 1933 the reported consumption was 90,438 tons; in 1934 it was 114,771 tons, an increase of 27 per cent.

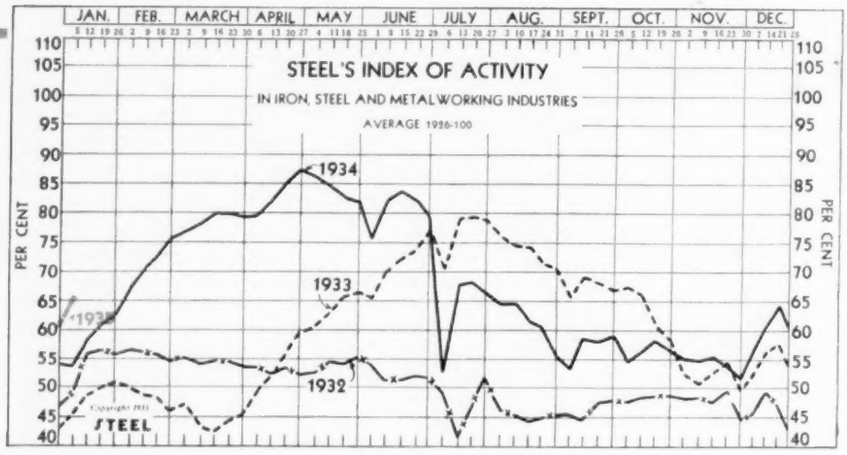
Undoubtedly the improved position of the farmers is partly responsible for the success of the automobile industry in making and selling approximately a million more motor cars in 1934 than in the preceding year. Reports on distribution show 3,311,589 tons of all finished rolled steel products credited to the automobile industry in 1934, as compared with 2,879,660 tons in 1933. Certainly a portion of this increase may be attributed to government influence.

If one were to pursue this analysis carefully through all of the consuming classifications, one might easily conclude that nearly all of the 10.4 per cent gain in steel ingot output or the 12 to 15 per cent gain in the production of finished rolled steel was traceable to government help. This means that the apparent improvement in 1934, in a larger measure than is realized, was the result of artificial stimulation, rather than of real, natural expansion of private demand. One might say that industry in 1934 was not in a state of recovery; it was on relief to the extent of about 10 per cent.

This sobering fact should accentuate the necessity of fostering natural improvement. President Roosevelt said wisely in his message to congress, "The federal government must and shall quit this business of relief."

Relief such as that which enabled the steel industry to show a small gain in production in 1934 is at best only a temporary expedient. If the same energy which was put into relief measures in 1934 will be put into provisions in 1935 for encouraging the natural flow of private business, recovery soon will lessen the burden of relief.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries gained 4.4 points to 65.2 in the week ending Jan. 5:*

Week ending	1934	1933	1932	1931
Nov. 24	54.4	55.4	44.5	54.8
Dec. 1	51.9	49.7	45.3	51.4
Dec. 8	56.8	52.6	46.6	52.9
Dec. 15	60.6	56.0	49.3	53.1
Dec. 22	64.4	58.0	46.9	52.3
Dec. 29	60.8	53.7	42.9	46.8
	1935	1934	1933	1932
Jan. 5	65.2*	53.6	45.3	48.8

*Preliminary.

Industrial Activity Starts Year at 1931 Levels

WITH this issue, STEEL inaugurates the weekly publication of a new index of industrial activity, which was shown on pages 134 and 135 of the "Yearbook of Industry" number (Jan. 7, 1935). The index, which is charted above, is based upon four weighted factors. The average weekly car loadings, the average weekly output of electric power and the average number of automobiles assembled weekly for the year 1926 each is given a value of 20. The average weekly rate of steelworks operations for 1926 is assigned a value of 40. These four values total 100 for 1926.

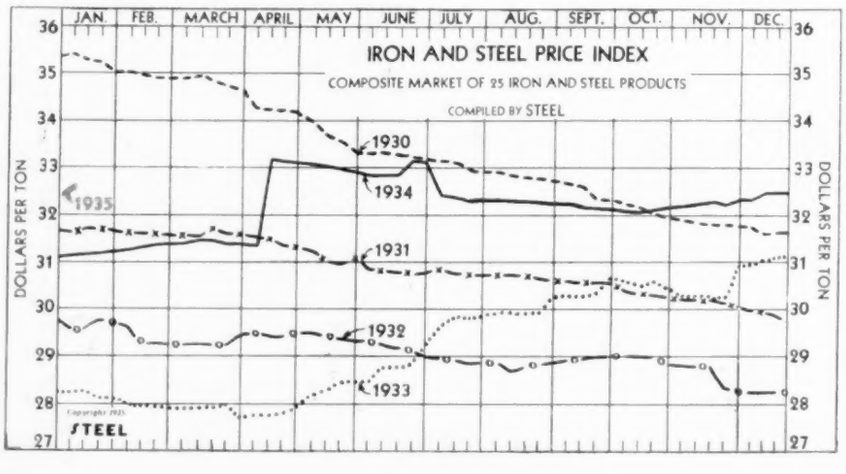
The index for any given week is calculated by evaluating the current figures in proportion to their corresponding 1926 bases, and adding the four results. Thus far no attempt has been made to adjust the index for seasonal variation.

Data for the index are obtained from the weekly car loading figures of the American Railway association, the weekly report of electric power output furnished by the Edison Electric institute, the weekly estimate of automobile assemblies by *Cram's Reports* and STEEL's estimated weekly steelworks operating rate.

These figures are available so that there is a lag of only a week between the end of the reported week and the date of publication of STEEL. It is believed this barometer will give a more accurate indication of the trend of activity in the iron, steel and metalworking industries than is afforded by the several indexes which are designed to reflect the fluctuations of all industries combined. A study of the above chart will show that the index has indicated major turning points promptly and also has been responsive to minor seasonal and other influences.

Sharp Gains Since Early in December Are Registered in Many Branches of Industry

The curve of industrial activity for 1935 is starting off at a level higher than in 1934, 1933 and 1932 and on a par with or slightly above that of 1931. The gains since early December are the most impressive that have been experienced since early last year.



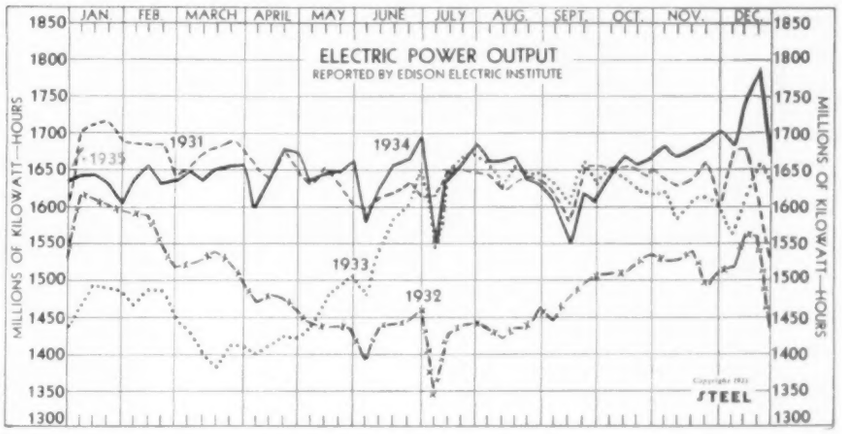
1935	
Jan. 5	$32.51
1934	
Dec. 29	32.46
Dec. 22	32.46
Dec. 15	32.44
Dec. 8	32.25
Dec. 1	32.22
Nov. 24	32.18
Nov. 17	32.15
Nov. 10	32.13
Nov. 3	32.13

1934	
Jan. 6	$31.10
1933	
Dec. 30	31.07
Dec. 23	31.07
Dec. 16	31.01
Dec. 9	30.96
Dec. 2	30.92
Nov. 25	30.24
Nov. 18	30.21
Nov. 11	30.28
Nov. 4	30.27

Power Output Holds Margin over 1934 Level

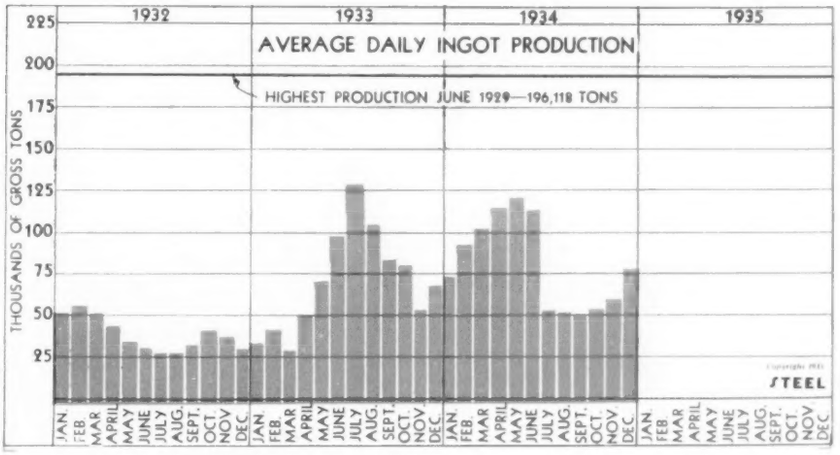
Million Kw.-Hours

1934		1935	
Jan. 6	1,563	Jan. 5	1,668
1933		**1934**	
Dec. 30	1,539	Dec. 29	1,650
Dec. 23	1,656	Dec. 22	1,787
Dec. 16	1,644	Dec. 15	1,767
Dec. 9	1,619	Dec. 8	1,743
Dec. 2	1,553	Dec. 1	1,683
Nov. 25	1,607	Nov. 24	1,705
Nov. 18	1,617	Nov. 17	1,691
Nov. 11	1,616	Nov. 10	1,675
Nov. 4	1,583	Nov. 3	1,669
Oct. 28	1,621	Oct. 27	1,677
Oct. 21	1,618	Oct. 20	1,667
Oct. 14	1,618	Oct. 13	1,656
Oct. 7	1,646	Oct. 6	1,659



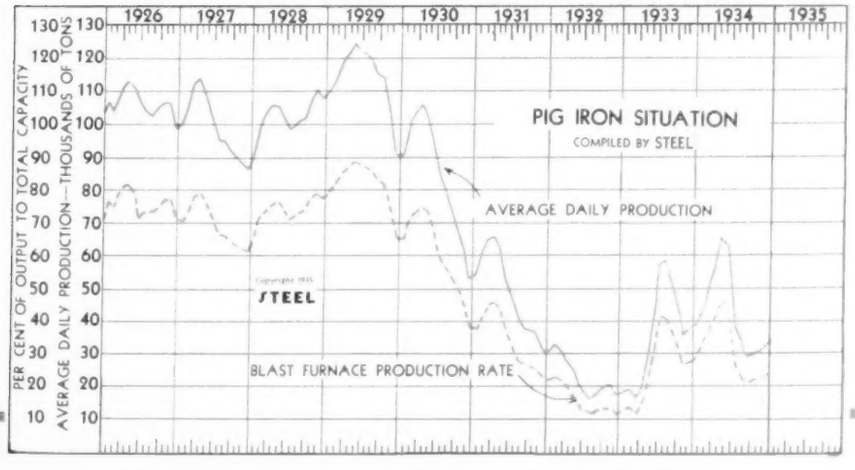
Daily Ingot Production Gains Sharply in December

1933	Tons
Jan.	39,110
Feb.	44,709
March	33,268
April	53,817
May	73,201
June	98,632
July	126,734
Aug.	106,058
Sept.	87,811
Oct.	80,188
Nov.	58,507
Dec.	71,944



1934	Tons
Jan.	72,999
Feb.	90,951
March	102,255
April	115,901
May	124,174
June	115,999
July	58,903
Aug.	50,495
Sept.	50,065
Oct.	54,146
Nov.	61,117
Dec.	77,645

Pig Iron Output and Rate Up Slightly



	Daily Average		Blast Furnace Rate	
	1934	**1933**	**1934**	**1933**
Jan.	39,537	18,348	28.3	13.3
Feb.	45,385	19,752	32.5	14.3
March	52,438	17,484	37.5	12.7
April	57,873	20,786	41.4	15.1
May	66,370	28,784	47.5	20.9
June	64,563	42,165	46.3	30.6
July	39,630	58,108	28.4	42.4
Aug.	34,199	59,137	24.5	42.8
Sept.	29,969	50,264	21.5	36.4
Oct.	30,689	43,824	22.1	31.8
Nov.	31,930	36,124	22.8	26.2
Dec.	33,153	38,456	23.7	27.9

Fig. 1—Arc welded steel cooling chamber was fitted with wooden filler pieces, thus reducing amounts of alcohol and dry ice required

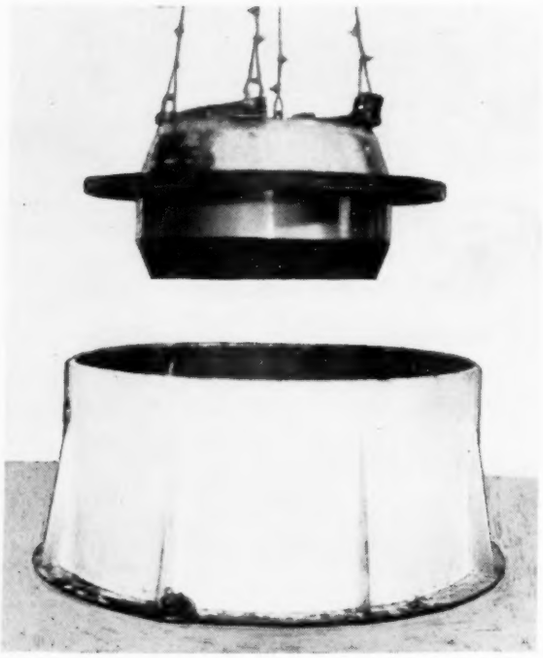


Fig. 2—After cooling for 2½ hours, the bearing hub was removed from the cooling chamber and inserted in the hole in the girder

Photographs courtesy American Bridge Co.

DRY ICE AND ALCOHOL USED TO SHRINK HUB IN GIRDER

WHEN the Federal Shipbuilding & Drydock Co., Kearny, N. J., was constructing four 95-foot girders for the American Bridge Co., to be used on a bascule bridge over the Shrewsbury River in New Jersey, an interesting shrink fit problem arose. Four bearing hubs were to be shrunk in; one in each girder. As it was desired to avoid the fire risk and the possible warping and damage to the girder attendant to doing the job with heat, serious consideration was given to the possibility of using dry-ice instead, providing it would prove practical and economical.

After a study of the requirements on this job, recommendations as to procedure were submitted by Pure Carbonic Inc. It was recommended that a cylindrical container be constructed, of sufficient diameter and height so that each of the four bearing hubs could be placed in it, in turn, for cooling. The container was to be insulated to keep out heat from the surroundings during the operation, and a circular wooden lid provided to cover the hub while cooling and to minimize cold losses. Means for lifting the hubs in and out of the container by crane were suggested, as each cast steel hub weighed 6390 pounds and the bronze bushing fitted in it 2050 pounds, making a total of 8440 pounds. Even light parts when cooled should not be touched with bare hands in any case.

Alcohol produced by the United States Industrial Alcohol Co., New York, was recommended as a heat-transfer medium. By immersing the hub in alcohol in the container and then breaking up the dry-ice in bags and dropping the pieces into the alcohol, it was expected that very rapid and efficient cooling could be obtained. The pieces of dry-ice are of high specific gravity (about 1.45), and in such operations sink to the bottom of the alcohol bath. The comparatively warm alcohol rapidly "evaporates" the dry-ice to carbon dioxide gas, which bubbles up through the alcohol, causing considerable "boiling" of the liquid. The dry-ice cools the alcohol which, in turn, cools the metal resting in it and "wetted" by the liquid. The "boiling" of the alcohol causes it to circulate in the container and greatly increases the rate of heat-transfer in abstracting the heat from the metal through the alcohol to the dry-ice. There is no danger of the dry-ice freezing the alcohol in such work, as the temperature of dry-ice is —109.35 degrees Fahr. while industrial alcohol freezes at approxi-

BY A. W. BROWN
Pure Carbonic Inc.
and
E. V. DAVID
Air Reduction Sales Co.,
New York

mately —175 degrees Fahr. However, water must be kept out of the container. Stirring the dry-ice alcohol sludge with a wooden pole increases the circulation and the rate of heat-transfer still further. While cooling, the addition of dry-ice must be continued as fast as possible, without allowing the container to "boil" over. In this manner, the alcohol is cooled at maximum speed and is kept as cold as the operation allows so that the temperature difference between the alcohol and the metal piece being cooled is as large as possible at all times. This, of course, also causes the part to be cooled more rapidly and reduces the cooling time still further. Aside from saving on labor and overhead, a shorter cooling period reduces the dry-ice consumption for the job, as there is less time for heat from outside to pass through the insulation into the container.

It was recommended that all four hubs be made ready and shrunk one after another, if possible. It was obvious that, on lifting the first cooled hub from the container, the container and the alcohol would be almost at the temperature of dry-ice. Therefore, without waiting for it to heat up, the second hub should be lowered into the container at once, to take full advantage of this cold in cooling it rapidly and with minimum further consumption of dry-ice dropped in the alcohol. In this manner, the container and the alcohol would have to be cooled only once for the four hubs.

Gas Film Avoided

Considerable cooling of parts for shrinking has been done by simply packing them in dry-ice, without the use of alcohol. However, the dry-ice, in sublimating, forms a film of carbon dioxide gas between the dry-ice and the metal surfaces of the part which is extremely nonconducting of heat, and the rate of heat-transfer from the piece to the dry-ice is, therefore, exceedingly slow. Hence, it takes many times as long for the part to cool. Furthermore, it is very difficult to tell whether the part has been fully cooled or not, or if it is fully cooled all over or only in places.

Where alcohol is used, however, it is easy to tell when complete cooling of the piece has occurred, as when it approaches the temperature of dry-ice it gives off heat very slowly to the alcohol. This permits the alcohol to cool to nearly dry-ice temperature and the dry-ice dropped in the alcohol gasifies very slowly. Liberation of the carbon dioxide gas and "boiling" of the alcohol are greatly reduced. This condition is quite apparent to the observer. Since the part is immersed in the alcohol which has been circulated around it, there is no question about its being cooled evenly all over. A thermometer installed in the side of the container, to show the temperature of the alcohol, is of value at various times during the cooling, as a check on the progress of the operation.

It is true, of course, that where industrial alcohol is used in the container it also must be cooled. This requires about 3 pounds of dry-ice per gallon of alcohol used. But, particularly where several pieces are to be cooled one after another, the extra consumption of dry-ice for cooling the alcohol is more than offset by the greatly increased speed of cooling with alcohol and the certainty of the operation. As a matter of fact, due to the greatly reduced cooling time, and the correspondingly smaller cold losses in the container, the total consumption of dry-ice will probably be less where alcohol is used, in most cases. Due to the above considerations, it was felt that industrial alcohol should be strongly recommended as a heat-transfer medium in the great majority of applications for shrinking with dry-ice.

Contained Fitted to Piece

To reduce the requirements of alcohol and dry-ice to a minimum, the container obviously should be no larger than necessary and be shaped to follow the contour of the piece wherever possible. Only sufficient alcohol to completely submerge the part in the container should be poured in. The sides of the container should be high enough above the surface of the alcohol, however, to allow for a normal amount of "boiling" and stirring of the liquid without spilling over.

For these bearing hubs, therefore, a cylindrical container was recommended, large enough to permit the hub flange, 5 feet 4 inches in diameter, to fit into it, but with wooden filler blocks installed inside the container to occupy the voids to within an inch or two of the contour of the bearing hub, thus reducing the alcohol requirements. A wooden cylinder, a few inches less in diameter than the 26½-inch bore of the brass was recommended to displace the large void in the center. In this instance, it was considered cheaper to construct a plain cylindrical container and use wooden filler blocks to make the inside fit roughly the contour of the bearing hub, than to endeavor to make a container with the sides themselves formed approximately to fit the piece.

Shrinkage Predetermined

It was estimated that to be sure of having sufficient dry-ice about 1500 pounds should be on hand for shrinking the first bushing. As regards shrinkage obtainable on the 45-inch shrink fit diameter, it was estimated that in cooling from 70 degrees Fahr. to —110 degrees Fahr., a total linear contraction of 0.045 inch would be expected. Naturally, it is very difficult to cool the part entirely to dry-ice temperature, even when alcohol is used. When the part has cooled to within 20 or 30 degrees Fahr. of the dry-ice temperature, the rate of heat-transfer at the small temperature difference becomes exceedingly slow, and as the temperature difference decreases it becomes increasingly slower, in proportion. Too much time and dry-ice would be consumed in attempting to cool the part down the last few degrees possible, and comparatively little additional contraction of the diameter would be obtained to compensate for this. Therefore, it was recommended that only about 0.035 inch total shrinkage be counted on in fitting these hubs in the girders.

It was further recommended that the hubs be inserted in holes in girders immediately after removing them from the cooling container and measuring the shrinkage obtained. An additional advantage of the alcohol method is that the part on removal from the liquid is covered with a thin film of alcohol. This prevents formation of frost on the piece which might otherwise be deposited on the surface of the shrink fit and

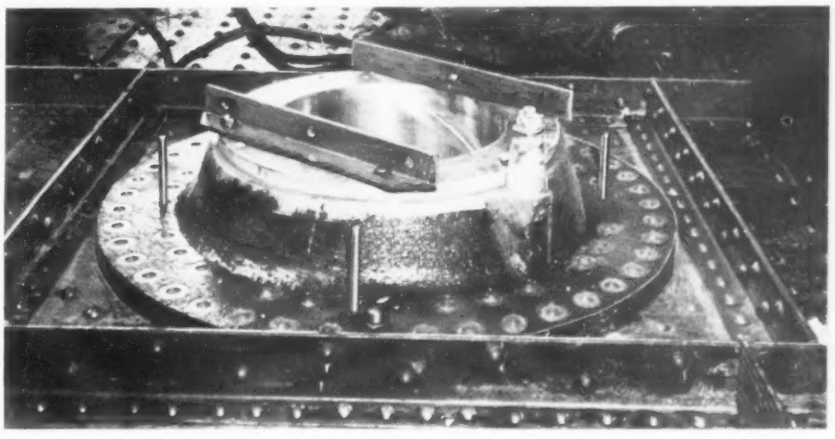


Fig. 3—Drifts were used in the final lowering of the hub. This operation had to be performed as quickly as possible, while the film of alcohol prevented the formation of a coating of frost

make it difficult to insert it in the hole designed for it. Furthermore, the alcohol has a lubricating effect on the wetted surface which assists in inserting the piece easily. Of course, if the operation is delayed until the alcohol wetting the piece has dried off and the piece begins to warm up again and expand, it may be found impossible to insert the piece in the hole, or else it may go in part of the way and stick. Where delays occur, the piece should be returned to the container and cooled again, before attempting to make the fit, thus avoiding all danger of failure and, perhaps, spoiling of expensive parts.

Fire Hazard Considered

No warpage of these bearing hubs should attend this operation, it was stated, and that there would be no permanent effect on the physical properties of the cast steel hubs or bronze bushings from shrinking with dry-ice. As regards the fire risk involved in this operation, it was advised that this was practically nil, although the alcohol used would be, of course, inflammable. There was no reason why it should catch fire, however, unless actually lighted with a flame or spark, and even if it were the concentrated carbon dioxide vapor rising in the container above the surface of the alcohol would act as a blanket of inert gas and tend to smother it and, in fact, prevent the fire from getting a start.

Carbon dioxide is one of the most efficient fire extinguishing mediums known. The carbon-dioxide vapors would be harmless to those standing around the container and conducting the operation, provided they were in the open or in a well ventilated space. However, such operations should not be conducted in closed or poorly ventilated spaces as carbon-dioxide, like other inert gases, if present in higher concentrations naturally impoverishes the air of oxygen and thus tends to have a suffocating effect. A drain for the alcohol, in the bottom of the container, or in the side at the bottom, was recommended.

These recommendations, after due consideration, were accepted and construction of the cooling container or chamber, shown in Fig. 1, was undertaken immediately. The steel shell with bottom plate and reinforcing ribs was of arc welded construction. The wooden filler pieces, fitted inside the container to fill up the voids around the bearing hub, may be seen plainly in this view and, the cylindrical wooden piece to fill the bore of the hub is shown in place in the center of the chamber. All wooden filler blocks were anchored or wedged firmly in place to prevent loosening and floating to the surface when the alcohol was poured in. When placed in the container, the large flange of the bearing hub rested on the lower ledge formed by the top surfaces of the inner circle of wooden filler pieces. The wooden ring shown behind the cooling chamber in the rear was then dropped into the container, resting on the large flange, and displacing or filling up the void above the flange. A disk-shaped wooden cover was placed in the chamber next, resting on the upper ledge formed by the top surfaces of the outer circle of wooden filler pieces. A small hole was provided in the center of this cover, into which a small wooden lid was fitted. This small opening was used for pouring in the alcohol and dry-ice, stirring the sludge, and for making observations during the progress of the cooling operation. The white appearance of the outer surfaces of the cooling chamber is that of Johns-Manville 85 per cent magnesia plastic cement, applied for purposes of cold insulation, to keep the heat from the surrounding air out of the chamber as much as possible. Doubtless a slightly higher efficiency could have been obtained by covering the top edge of the bottom plate all the way around and the reinforcing ribs as well with magnesia. However, the bottom plate rested on a wooden platform consisting of heavy loose boards, which acted as heat insulating material underneath.

Bronze Bushing in Place

Shrinking was done with the bronze bushing installed in the bearing hub in every case. The hubs were placed in the cooling chamber with the flange on bronze bushing upward. In this manner there was no danger of the bronze bushing falling out of the hub, if the shrinking loosened it. As the hub had to be lowered into the hole in the bascule bridge girder by crane, this was the natural position for the part to be placed in the cooling chamber, as it could be lifted out and dropped directly into the girder without turning.

It had been decided to shrink one hub into the girder first and, if this initial experiment proved successful, to proceed with the remaining three, one immediately following the other.

The bearing hub had been machined 0.008-inch oversize on the shrink fit diameter for the hole in the girder into which it was to be shrunk. It was estimated that 0.010-inch clearance would be needed to enable the hub to be lowered into the girder freely, without jamming. Hence, a total of only 0.018-inch shrinkage was required, the officials having decided to be conservative on this first job.

After lowering the bearing into the cooling chamber, and installing the wooden filler ring and cover in place over it, 120 gallons of industrial alcohol were poured in, until the top of the bronze bushing was just covered by the liquid. Then dry-ice was broken up into small pieces by hammering it in bags. This was done to give the alcohol more surface of dry-ice to work on, the small pieces sublimating much more rapidly than large chunks and accelerating the cooling operation. The small pieces of dry-ice were dropped or shaken out of the bags into the alcohol in the container. The alcohol "boiled" quite noticeably, particularly at first, and, in addition, was circulated around the chamber by continuous stirring. Some 1200 pounds of dry-ice were broken up and dropped into the alcohol. Then the small lid was put in place and the container with the hub in it was allowed to stand for awhile, except for occasional stirring. The entire cooling time was about 2½ hours.

Shrink More Than Sufficient

At the end of this period the cover and filler ring were removed and the slings made fast to the bearing hub, which was then hoisted out of the cooling chamber with a traveling crane, as shown in Fig. 2. This view shows the cooled hub, still wet with the alcohol. The wet surface is particularly noticeable in the photograph on the diameter machined for the shrink fit, on the lower portion of the hub. This diameter was quickly calipered and was found to have shrunk 0.030-inch, or 0.012-inch more than required.

The bearing hub then was moved over the hole for it in the bascule bridge girder and lowered into it quite easily. Fig. 3 shows the bearing hub just after having been put finally in place in the girder. As shown in the illustration, drifts were used in the last stages of lowering, to center the hub as it entered the hole in the girder and to line up the holes in the hub flange with those in the girder. The temperature of the alcohol in the cooling chamber at the time the bearing hub was taken out was found to be —48 degrees Cent. or —54.4 degrees Fahr.

The remaining three bearing hubs were shrunk into their respective bascule bridge girders, quite as easily and successfully as the first hub, a short time afterward. In fact, as they were done one after another in one continuous operation the dry-ice requirements per hub were considerably lower than for the first hub, which was done singly. One interesting observation was that the alcohol dissolved considerable carbon dioxide gas, particularly when very cold. On removing a cooled hub from the container and replacing immediately with a comparatively "hot" hub, the very cold alcohol was naturally warmed up by the heat from this part quite rapidly. The alcohol at higher temperature could not retain as much carbon dioxide gas in the dissolved state, with the result that at first this gas was quickly driven off and the alcohol "boiled" rather violently, even before any more dry-ice had been dropped in it.

HELICAL GEARS—

Yesterday, Today and Tomorrow

BY P. C. DAY
The Falk Corp.

INTERESTING recollections on the early history of helical gears in this country, together with a critical appraisal of modern gears, bearings, lubricants, couplings and related equipment are presented in this discussion by P. C. Day, associated with the Falk Corp., Milwaukee. The article is abridged from a paper presented by Mr. Day at the meeting of the American Gear Manufacturers association in Milwaukee in October.

HELICAL gears, in the modern sense, were born about 30 years ago when a Swiss engineer invented the Wuest gear which bears his name. It is true that the principle was understood before that time and that a few attempts had been made to cut single helical gears to be used singly or in pairs of opposite hand, but no one had solved the problem of making a double helical or herringbone gear with reasonable precision in a practical commercial way. Single helical gears found little favor at that time because of the lack of adequate thrust bearings. The ball and tapered roller bearings of today were not commercially available; plain thrust bearings were looked upon with some distrust.

Double helical gears with cast teeth are, of course, much older than the Wuest gear, but they have never been successful because the inevitable errors overbalanced the advantages of the helical principle.

The cut spur gear antedated the Wuest gear by several years and its superiority over the imperfect double helical gear with cast teeth caused the latter to fall largely into disuse before Wuest came upon the scene. The pioneer development of the modern double helical gear began in England in 1905 when the Power Plant Co. acquired the British rights for the Wuest patents.

Design Rules Have Changed

In those early days the strength of gear teeth to resist shock was given more consideration than anything else. It was not so much a question of transmitting a known load from a prime mover to a driven machine as it was of providing against the effects of irregularities and imperfections in the gears themselves. Most rules for design which had been laid down previous to that time were based on the supposition that errors of tooth form and spacing would cause such sudden variations of velocity-ratio as to produce stresses out of all proportion to the load transmitted, but which had their origin in the inertia of the rotating masses on both sides of the gear train.

The early success of the cut helical gear was, in a large measure, due to the greater care and precision workmanship necessary for its production and to the superiority of hobbing and other generating processes to those usually employed at that time for cutting spur teeth. Those early helical and double helical gears were far from perfect and much of the progress that has been made in the meantime has been a slow, but continuous reduction of the gap between theoretical perfection and practical performance.

Wuest gears were introduced in this country by the Falk Co. in 1910, but machines had to be built so that it was not until the fall of 1911 that the first large gears were put into service. The first cut herringbone gears used in this country for driving a steel mill antidated the first Wuest gear by a few months. They were designed along the lines of prevailing spur gear practice and the proportions, from our point of view, were outrageous.

Soon after we put the first large Wuest machine into operation we had an opportunity to build the gears for an engine-driven sheet mill at Farrel, Pa. We chose gears of 1 diametral pitch, which was the largest pitch we could cut at that time, but was so much smaller than anything that had been used before for the same purpose as to arouse a chorus of disapproval from builders and operators of rolling mills and equipment. As I recall it, the pitch was just half of what was considered to be rational at that time, while the tooth loading was higher because the diameter of our gear was only 60 per cent of the one just referred to, and the width of face was in about the same proportion.

The contract was given to us with a long string tied to it in the form of a perpetual guarantee to be renewed from year to year if the renewal should be considered necessary in the opinion of the engineers and operators of the mill. After the first year of service the gears were examined, found to be in perfect condition, and we were absolved from our guarantee. These gears are still giving good service, along with dozens of others built between 1912 and 1916.

Herringbone gears were proportioned conservatively at that time, and failures were practically unknown. The materials available consisted, for the most part, of plain carbon steel forgings and open-hearth steel castings of normal grade. There was no need to bother with alloy steels and heat treatment, but the comparative absence of competition allowed the choice of liberal dimensions which insured many years of trouble-free service.

Closer to Requirements

However, times have changed so that today with intense competition, design must be kept closer to actual requirements in order to keep down initial cost. While this is true for all applications, it is particularly so in the production of the standardized lines of small speed reducers and motoreducers which are so popular today. Advantage must be taken of all available improvements in materials and heat treatment in order to produce reliable products that are at once more compact and more economical for manufacture in quantities.

The capacity of gears is not entirely a matter of dimensions or of the physical properties of the materials from which they are made.

The design and rigidity of the supporting structure, the choice of suitable bearings and the selection of the proper kind of lubricant and the method of applying it are all important factors to be observed.

Consider a few of the new features that have appeared during the last decade. We have the herringbone gear with continuous teeth, the single helical gear, the entire line of ball and roller bearings, the welded system of frame construction, and the ever-growing list of special lubricants generally classified as the extreme-pressure type. There is merit in all these when applied logically and with discretion. However, it becomes rather confusing to the engineer who is striving to pick out the best product when the maker of each of these specialties insists upon his claim to preference for every application, regardless of the nature of the problem involved. Take, for example, the double helical gear with continuous teeth. This is an excellent gear when properly made, but it is not necessarily the one and only substitute for all other types.

Strength Not Prime Factor

The added strength of gears which are joined at the center is undeniable, but the strength of gear teeth does not have to be taken into consideration in more than 5 per cent of all applications. The necessity for reducing pressures to provide against wear always leaves a great surplus of breaking strength. The claim that the entire face is active whereas all double helical gears of the hobbed type require some space in the center is perfectly obvious. The advantage of the continuous tooth is conceded for narrow gears and it is used in many standard speed reducers where every fraction of an inch counts in the cost of production.

Wuest gears are generated by means of hobs while gears with continuous teeth require reciprocating cutters. It is not the writer's intention to invite controversy by comparing the merits of the two systems—take your choice. Either type can be generated in pure involute form but, since experience has shown that some form of tip relief is desirable, it is practice to use straight-sided, multi-thread hobs which provide this relief automatically. There are several thousand Wuest gears in this country that have been performing the most exacting service for periods ranging from ten to more than 20 years, and most of them are in practically the same condition today as when they were put in. The modern Wuest gear involves no change in principle, but it is a better gear by reason of the improvements in accuracy of machine work, and especially in the manufacture of hobs, that have taken place during the interval.

The fact that the teeth do not join in the center, never of much importance in large gears, is of less consequence than ever by reason of the modern tendency to reduce the pitch of the teeth in relation to the width of face. It becomes a mere question of which type can be manufactured for the lowest cost or of who is willing to sell for the least money. The single helical gear has advanced in prominence during recent years due, for the most part, to the commercial expansion of the thrust-resisting type of roller bearing. A single helical gear is also an excellent gear when carefully made, but there is no justification for extravagant claims at the expense of the other type. Whenever it is merely a question of driving through two gears from one parallel shaft to another, the natural balance and elimination of thrust is of obvious advantage and it is scarcely logical deliberately to introduce a thrust condition merely because it can be counteracted efficiently by some conical roller bearings or similar device. You still must provide in your gear frame for axial forces which do not have to be incurred.

On the other hand, whenever two or more parallel shafts are connected by gears under conditions where the shafts themselves are subjected or may be subjected to axial thrust from external sources, then the single helical gear offers decided advantage over the herringbone type. Under these conditions one helix of a herringbone gear must always be underloaded while the other helix is overloaded and, in extreme cases, the entire load may be transferred to half of the available gear face.

What About Bearings?

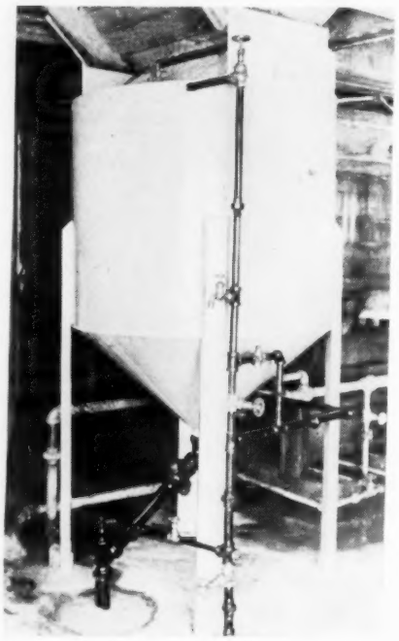
The matter of bearings requires a little consideration. In the early days there was little choice; in fact there was nothing available for the larger applications but the sleeve bearing. The general idea was to hold down the pressure to absurdly low limits, and to do so long bearings were built which usually were fed parsimoniously with any old oil regardless of its viscosity and general characteristics, and the load bearing surfaces were slashed all to pieces with grooves intended to assist lubrication, but which usually had precisely the reverse effect.

The modern sleeve bearing is an efficient and durable device provided that it is designed with proper regard for the purpose in view and finished with some of the care and precision without which the ball and roller bearing would be impossible. The lack of enthusiasm that appears to exist in some quarters for the sleeve bearing can be traced to the fact that this bearing is nobody's child and, as a consequence, no one is interested in defending it against the tremendous pressure of publicity and sales effort exerted by the manufacturers of so-called antifriction bearings in their own interest.

Experience has shown that far higher loads can be carried on sleeve bearings than previously were considered possible provided that they are designed to maintain an unbroken oil film, and are furnished with an adequate supply of oil of the right viscosity and given the correct running clearance to utilize that oil with maximum efficiency. Of course, in many applications the ball or roller bearing is indispensable, notably where compact dimensions and simplicity of lubrication are paramount; but consider the common case of the large reduction gear as applied to transmissions for heavy rolling mills, mine hoists, rubber mills and similar work.

Large roller bearings are expensive—much more so than sleeve

Use for Clad Steel



NICKEL-CLAD STEEL IN ROCK SALT DISSOLVER: Top, shell and conical bottom of this rock salt dissolver, operated by the International Salt Co., Scranton, Pa., are of nickel-clad steel, with piping and fittings of monel metal. The unit is 48 inches in diameter and is capable of producing 200 gallons of pure saturated brine per hour. Corrosion is avoided since the brine comes into contact only with the pure nickel surface of the equipment. Nickel-clad steel is a joint development of the International Nickel Co. Inc. and the Lukens Steel Co., produced in the latter's mills at Coatesville, Pa.

bearings of equal capacity. To justify their use in gear transmissions they should show advantages to make up for the extra cost. Suppose that great precision is needed, requiring the smoothest possible gear operation. It is possible to nullify the result of extreme care in gear manufacture by mounting the shafts in large roller bearings without specifying beforehand close limits of concentricity in the bearings themselves. This is because the hardened inner and outer races of roller bearings must be truly circular and the rollers themselves must be of extremely uniform diameter in order to achieve the desired result.

Factors in Buying Bearings

The ordinary large roller bearing of commerce is sold with rather liberal limits of "run-out." If it is desired to hold these limits down for a special purpose, the bearings are more expensive in consequence. A roller bearing requires concentricity for the shaft, the inner race, the rollers and the outer race. The shaft only need be round to run true in a sleeve bearing. A sleeve bearing is always made in halves and can be removed or replaced without difficulty or loss of time. Replacement of a roller bearing on large drives entails pulling off heavy couplings, flywheels and the like, and replacing them after the repair is made.

There is little to choose in the matter of efficiency between the two types, provided that each is correctly designed and lubricated for the purpose in view. The roller bearing has some slight advantage in the matter of simplicity of lubrication, but the growing use of the modern extreme pressure lubricants, suitable for both bearings and gear teeth, has offset this feature to a great extent.

One of the most important points in the design of gear transmissions with sleeve bearings is to arrange the gears in symmetrical formation not merely for the purpose of equalizing the load and wear on each pair of bearings, but also to avoid tilting of the shafts across the relatively large running clearances in such bearings, which would be detrimental to the operation of the gears. Roller bearings are, for the most part, designed to operate with little running clearance and practically no wear at all is allowable before the bearing is ready for the discard. For this reason there is a fundamental difference in correct design of double and triple reduction units with parallel shafts for sleeve bearings and roller bearings.

For many years practically all gear frames and cases were made from gray iron castings covering the whole range from the largest steel mill drives to the smallest speed reducers. In recent years has come a tendency to substitute first steel castings, and then a combination of castings and welded plates in the construction of the larger units. There are a few cases in steel mill practice where the expectancy of unusually heavy shock loads justifies the use of steel frames in some form, but in the majority of applications cast iron is perfectly satisfactory.

Again, it seems preferable to adopt an open-minded middle course, taking advantage of the new types of construction offered whenever there is something to be gained thereby instead of insisting upon the adoption of a new idea just because it is new, regardless of its complete suitability for the problem in hand.

In the writer's experience the principal advantage of the welded gear frame lies in its flexibility of application to special designs for some particular installation which is not likely to be repeated. In such cases the saving in the cost of patterns and development more than offsets the extra cost of the fabricated frames.

Welded frame construction is also an advantage in some marine applications where it is essential to hold the weight down to the lowest possible limit and still retain sufficient strength and rigidity. However, when a large number of identical units is required, as in the case of current government programs for cruisers and destroyers, it is possible to use skeletonized cast steel construction with no disadvantage in the matter of weight and with the certainty that there are no internal stresses left in the structure which might cause eventual distortion and misalignment of the gears.

Welded Gears Not Always Best

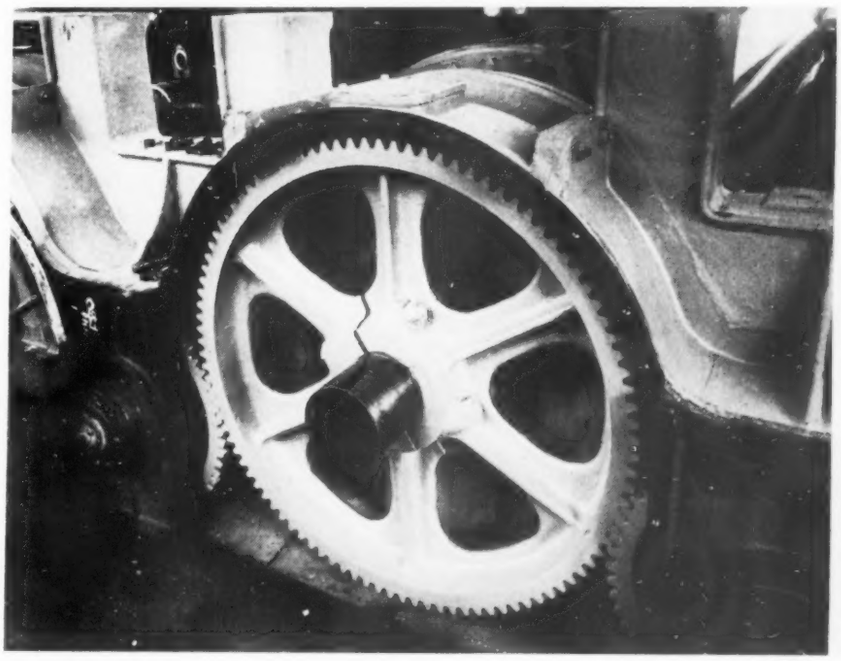
Some of the steel companies have begun to specify welded construction for the gears, with the desire to utilize the products of their own mills. The Falk Corp. recently was called upon to make several large mill gears of the welded type which cost more than cast steel gears of the same dimensions; and cast steel gears would have been better adapted for the service required.

Some of the most important advances in modern gear practice have been influenced by the advent of new types of lubricant. In the early days only two classes were available; mineral oils suitable for bearings and for light gear work, and semifluid compounds for the protection of heavy-duty gears. These compounds were poison to bearings and would lose their protective value if mixed with oil, so that large gear units were designed with two separate systems of lubrication and it required much thought and study to insure that the separation would always be complete.

During the last five or six years

(Please turn to Page 36)

Wear Resisting Gears



DEVELOPS NEW COMPOSITION FOR LARGE CAST IRON GEARS: For gears weighing approximately 1500 pounds each and having a 3-inch rim, the Pusey & Jones Corp., Wilmington, Del., now is using iron of the following analysis: Total carbon 3.25; silcon 1.35; manganese 0.80; molybdenum 0.50 per cent. The resulting iron has a brinell hardness of slightly more than 200 but its machinability is so good that the hobbing operations continue the same as formerly employed. These gears are produced in batches of 15

METHODS AND MATERIALS

Parts for Type Setters Require Great Accuracy

Of the numerous miscellaneous parts of a line type composing machine which have to be ground, probably 60 per cent of the work is done on mold bodies, mold caps and liners, with much of it highly exacting. For example, on the machine built by the Intertype Corp., Brooklyn, N. Y., the mold body has 15 surfaces and two grooves ground, and the cap, later assembled to the body, has seven flat surfaces, three ½-em grooves and 15 grooves ranging in depth from 0.056 to 0.477-inch. Liners, which also enter into this assembly, vary in size from 5 to 14 points in width and 4 to 30 ems in length.

For much of this work, silicon carbide wheels, manufactured by the Carbonundum Co., Niagara Falls, N. Y., are used, with the grit varying from 40 to 80, depending upon the operation, and with I, J and K grades usually specified. Aluminum oxide wheels, manufactured by the same company, are used for certain of the operations. Much of the work is done on No. 2 surface grinders built by the Brown & Sharpe Mfg. Co., Providence, R. I., with the wheels, which usually range from 6 to 7 inches in diameter and from ⅜ to ½-inch in width, operated at 3200 to 3300 revolutions per minute and with the work being passed automatically back and forth in front of the wheel at a rate that varies depending principally upon the size of the work.

Considerable work is done also on rotary grinders, built by the Blanchard Machine Co., Cambridge, Mass., equipped with silicon carbide segment wheels. As many as 28 lines are placed on a rotary grinder at one time for roughing and finishing. Certain roughing operations on mold bodies are done on this type of machine, 10 pieces being ground at one time.

s s s

Process Hardens Surface of Aluminum Pistons

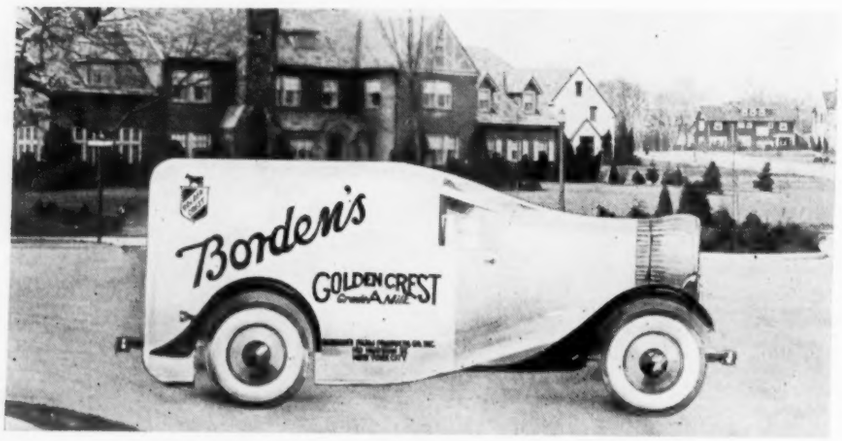
Electro-coating of pistons by a process developed recently by Chrysler engineers is considered a notable advancement. In the past, aluminum pistons, although regarded by leading engineers as superior to other types, had the drawback of being soft enough to be subject to considerable wear and scuffing. This new process now makes possible a surface coating on aluminum pistons that is extremely hard. The process is simple. Pistons are immersed for 17 minutes in a tank containing a solution of sulphuric acid maintained at a temperature of 70 degrees Fahr. While in the solution, the piston, carried on a conveyor, is the anode for the coating operation. It emerges from the tank with an aluminum oxide surface approximately 0.00025-inch thick.

s s s

Simple Clamping Method for Molds Is Used

In a paper presented at the recent convention of the American Foundrymen's association, the author directed attention to a method of securing solid steel castings with a greatly reduced volume of steel in the risers or sinkheads. The method is based on the theory that gravity plays an important part in feeding the casting, that the top of the casting should be the last place to freeze and that the maximum temperature of mold and metal should be combined at that point. This result is secured by pouring the metal through a gate at the bottom, placing the riser at the bottom, and then

New Streamlining Technique



MILK BOTTLE ON WHEELS: New milk truck is built of No. 20 gage steel sheets and weighs 800 pounds. It has a surface coating of enamel paint. Used by Borden's Farm Products Co. Inc., 110 Hudson street, New York, for making special deliveries of milk and cream, the company says that this truck, despite its odd appearance, is thoroughly practical in addition to having advertising value. This is the first of a fleet of such trucks to be placed in service by Borden's

reversing the position of the mold after it is filled with metal. Several modifications of the method may be adopted. In one, the mold is placed in an inclined position, poured at the low end with an auxiliary gate feeding metal into the riser. After filling, the mold is tilted to the opposite position.

S S S

Silver Soldering Stops Leaks in Aircraft Tanks

A manufacturer making spot welded stainless steel tanks for use on airplanes found that these tanks developed leaks due to opening by vibration of joints closed with soft solder. By using a higher priced silver solder, the joints were stiffened and the development of leakage caused by vibration was eliminated. The same manufacturer found that development of leaks in stainless steel floats also was brought to an end after joints in these floats were brazed with the use of silver solder.

S S S

New Copper-Lead Alloy Resists Acid and Heat

One of the newest sulphide liquor and heat-resisting alloys contains copper and lead in addition to chromium and molybdenum. The preferred analysis shows 20 per cent chromium; 1 to 3 per cent molybdenum; 3 per cent copper; and ½ to 2 per cent lead, according to the patent. The lead is added in the ladle and is said to reduce the size of the grain boundaries, and retard grain growth encountered at high temperatures.

S S S

Tappets Are Produced from Electric Furnace Iron

Tappets have been made from electric furnace iron with a tensile strength of 41,000 pounds per square inch, a chill of 0.100-inch at the center and full chill at the edges without a sharp chill line. The charge consisted of bessemer pig iron, 20 per cent; steel scrap, 72 per cent; and cast iron scrap, 8 per cent. Total rejection for all causes was 4.5 per cent.

S S S

Devises Method for Heat Treating Alloy Cast Iron

A cast iron containing total carbon 2.75 to 3.00 per cent, silicon 2.40 to 2.70, sulphur 0.10 maximum, phosphorus 0.10 maximum, manganese, 0.60 to 0.80, nickel 1.50, and chromium 0.50 per cent, was heat treated by heating to 1550-1600 degrees Fahr., quenching in oil or water, and tempering at 850-950 degrees Fahr. Selection of the quenching medium depends on the section, heavy sections being quenched in water and light sections in oil. Brinell hardness of the treated castings was 286 to 321, and tensile strength 81,000 pounds per square inch.

Sheet Annealing Covers Equipped with Gas-Fired Radiant Tube Heaters

AMONG a number of installations of radiant tube sheet annealing covers, one has been made recently in a plant of a large steel company for annealing full finished autobody sheets.

The installation, as shown in accompanying illustrations, comprises a ruggedly constructed steel shell lined with high grade insulating refractory, and a base similarly constructed, both cover and base being movable. Lifting lugs are provided at the top so that no strains are set up in the casing when lifting the cover.

This cover is heated by means of radiant tube elements placed in a horizontal position along the side walls and extending through the end walls. Through specially designed tube mountings, means are provided for maintaining a tight seal during the expansion and contraction of the tubes. Surface Combustion Corp., Toledo, O., designed and built the equipment.

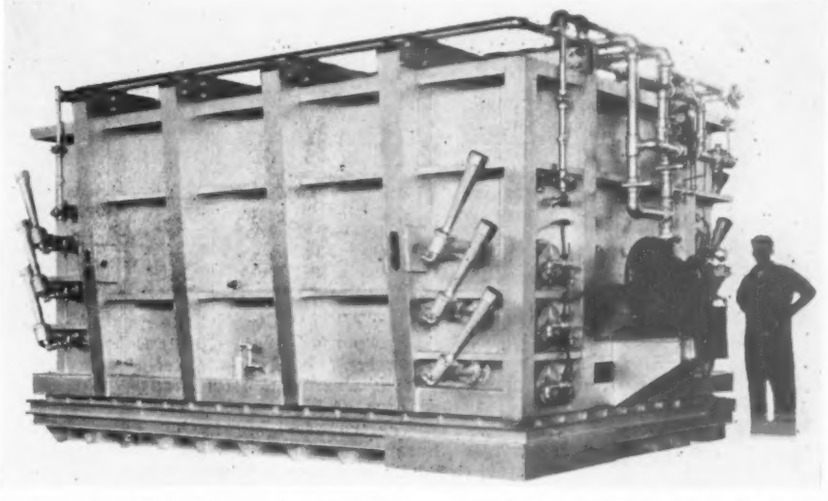
A plurality of heating elements is used for controlling the temperature vertically. It has been proved necessary to control the heat input in this manner.

The radiant tubes are heated with gas by means of diffusion combustion, in which gas and air enter the tube at the inlet end and combustion takes place progressively along the inside of the tube, terminating at any place desired. This type of combustion produces a soft but radiant flame, which permits a high rate of heat transfer with a low thermal head, and an increased efficiency over premix combustion. A uniform temperature is produced, free from hot spots, minimizing tendency of the tubes to crack.

Air for combustion is entrained from the inlet burner by eductors placed at the outlet and powered from the air blower placed directly on the cover. Each tube is always under a negative pressure so that at no time can products of combustion enter the cover to discolor the sheets.

The operation of the cover is fully automatic. Once the burners are set, the temperature control instruments control the operation of the burners until the desired temperature is obtained, when the gas is manually shut off and cooling air is applied to accelerate cooling before removing the cover. No manual attention is required after the burners are lighted until the completion of the heating cycle.

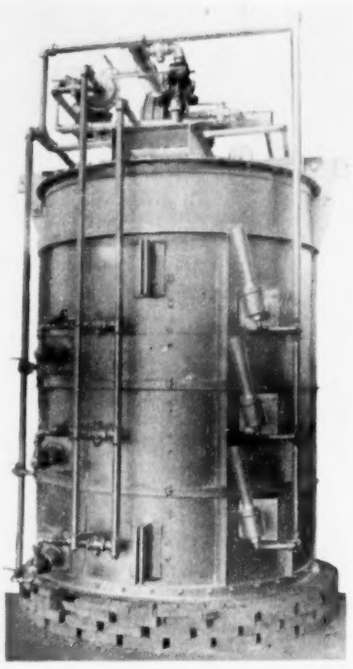
Due to the basic principles employed in its design, this cover will produce bright annealed steel sheets



Rectangular-type radiant-tube annealing cover. Note welded plate construction

using DX atmosphere gas without an inner cover. It is claimed to produce a sheet free from borders, and corrugations. Piles of sheet 58-inch high by 65-inch wide and 115-inch long are said to be heated uniformly from end to end within 10 degrees Fahr. and with no temperature differential top to bottom, with a fuel consumption less than 1,000,000 B.t.u. per ton, and a considerable saving in time of heating.

On such material where relatively high cooling rates are permissible, inner covers of light plate construction are used so that the annealing hood may be removed before completion of the cooling cycle. Long life may be expected from these inner hoods as it is arranged that gas is introduced to both sides of the hood, thus preventing oxidization during the heating cycle.



Bell-type annealing cover, primarily for use over a stack of coiled material

Alarm Bell Gives Warning Of Carbon Monoxide Gas

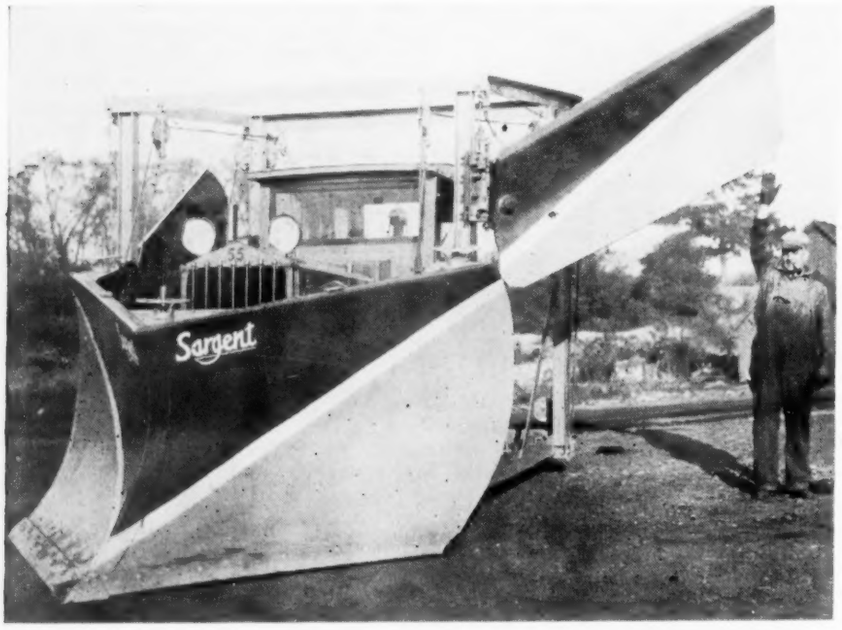
In announcing a new carbon monoxide alarm which gives warning by ringing an electric gong when the amount of carbon monoxide in the air reaches the danger point, the Mine Safety Appliances Co., Pittsburgh, points out that carbon monoxide poisoning has become the fourth largest cause of industrial diseases, accidents and deaths. A report issued by this company on symptoms and effects of carbon monoxide poisoning reads in part as follows:

Many a workman accused of inefficiency or malingering has been, in reality, a victim of carbon monoxide poisoning in the primary stage. Between 40 per cent and 60 per cent saturation the victim passes into unconsciousness, and beyond 60 per cent death follows. Resuscitation measures will usually revive victims of the secondary stage,—provided, however, they have not been exposed too long, or to too great a concentration of the gas.

There is no such thing as a natural or acquired immunity to carbon monoxide. Repeated exposure produces identically the same effect each time. Indeed, leading medical authorities assert that under repeated exposures to small quantities of the gas, the physical symptoms characteristic of the primary stage of carbon monoxide poisoning tend to become chronic and much heightened in effect. Chronic carbon monoxide poisoning victims frequently manifest serious disturbances of the nervous system, mentality, heart or other bodily organs, and may be totally disabled for work over long periods.

Exceedingly small amounts of carbon monoxide carry danger for workmen. A concentration of 0.2 per cent may produce headache in a few hours' exposure. A concentration of 0.6 per cent may produce headache in less than an hour, and unconsciousness in two hours, while 0.10 per cent carbon monoxide may prove fatal in approximately four hours. To make matters worse, the gas gives no warning,—it cannot be seen, smelled or tasted in any concentration. Obviously, there is vital need for positive means of warning workmen of the presence of this gas in dangerous amounts.

Bring on the Snowdrifts



SNOWPLOWS ARE OF RUGGED CONSTRUCTION: To fight their way through deep snowdrifts, up hills and over rutty, rocky roadbeds, they must be designed correctly and sturdily. This Sargent plow, built by Maine Steel Products Co., South Portland, Me., has a frame made from structural steel shapes. The moldboards are steel plates. The cutter bars are of high carbon steel. A number of electric steel castings are used. The entire assembly is fabricated by the electric arc welding process. These plows are mounted on the forward end of motor trucks or, where the going is difficult, or where it is necessary to clean out roads in straight lines without weaving, on tractors. Photo courtesy Cleveland Tractor Co., Cleveland

Bolt Action Under Suddenly Applied Loads Determined

In an endeavor to assist designers of machines and structures by providing them with more accurate data on the impact and tensile properties of bolts, 360 specimens were tested recently at the national bureau of standards, Washington. These specimens represented all possible combinations of five different materials, four different bolt diameters, and three different forms of screw threads in common use.

In practically all cases the work required to rupture the bolts under suddenly applied loads was greater for bolts having fine threads than for those with coarse threads. The only exceptions were certain brass bolts and cold-rolled steel bolts which showed brittle failures. For bolts of the same size and having the same

threads the bolt efficiencies were approximately the same for all of the materials, the tests show.

Since bolts are used in almost every machine and structure where it is necessary to fasten together parts which cannot be made readily in one piece, or which must be removed for adjustment, cleaning, or repairs, and since practically no data on their physical properties are available, the information which the Bureau has assembled should prove of value.

Engineers will find it easier to work out designs for they can now pick out screw threads that will give the best results under any given conditions, while the public will benefit through increased safety and efficiency, according to the standards bureau.

Study of Combined Oxygen in Steel Is Encouraged

The importance attached by steel metallurgists to the project under way at the national bureau of standards, Washington, on the reliability of methods used for the determination of combined oxygen in steel is attested by the recent approval by the Iron and Steel Institute of Great Britain, according to a release by the department of commerce, Washington.

Five research laboratories in Great Britain recently have been encouraged by the institute to participate in this co-operative study, it was stated. The co-operating foreign laboratories now number 17; the total number of laboratories engaged in this work is 37.

Iron Oxide Now Serves As Glass Coloring Agent

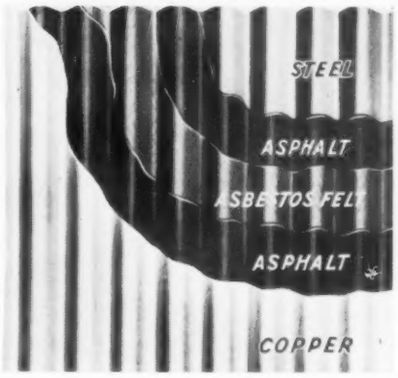
Heat absorbing glasses may be made by using reduced iron as one of the coloring agents in glass. This fact was disclosed by H. P. Page, chief, optical laboratory, Corning Glass Works, Corning, N. Y., at a recent meeting of the Illuminating Engineering society conducted in Baltimore.

When artificial light sources are used, in which perhaps 10 per cent of the radiant power emitted is useful as light and 90 per cent serves merely to warm up all objects upon which it impinges, it may be desirable to intercept this useless radiation near the source and remove the resulting heat by a ventilating device.

The process of sorting out the portion of radiation useful as light from the invisible portion is facilitated by a type of glass called "heat absorbing glass" which has a high transmission for the visible and a low transmission for the invisible or infrared portion of the spectrum.

The transmission properties of this glass may be calculated if the spectral transmission of the glass and the spectral energy curve of the source are known. Methods of measuring this energy are presented in a 16-page paper which can be obtained from the previously mentioned society, located at 29 West Thirty-ninth street, New York.

Composite Metal



ADDS TO EYE-APPEAL: By applying a thin sheet of copper to its felt-covered steel, the H. H. Robertson Co., Pittsburgh, has produced a roofing and siding material of improved appearance. As the illustration shows the new corrugated metal comprises a core of steel protected by successive coatings of asphalt and impregnated asbestos felt, an outside weather resistant bituminous compound and the outer covering of copper. Relative thickness of the two metals: A 22-gage steel core sheet is 0.0245-inch thick, and the 1-ounce copper used is 0.0013-inch. The sheet as a whole is about 0.107-inch thick. On exposure, the copper surface gradually darkens to a deep brown and in many localities, particularly along the seaboard, will acquire the characteristic green patina. The copper covering used is electrosheet copper produced by the American Brass Co.

Tentative Standards of A.S.T.M. in One Volume

Book of A. S. T. M. Tentative Standards, 1934; cloth or paper, 1250 pages, 6 x 9 inches; published by American Society for Testing Materials, Philadelphia; supplied by STEEL, Cleveland, for $8 in cloth and $7 in paper, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This publication, issued each year by the society, is the only volume containing all of its tentative specifications, methods of test and definitions of terms covering engineering materials and the allied testing field.

The 1934 edition contains 236 tentative standards, 48 being included for the first time and 60 having been revised in the past year and now given in the latest approved form. Of these standards 25 are of ferrous and 25 of nonferrous metals.

New tentative specifications published for the first time in 1934 cover the following ferrous and nonferrous materials: Electric fusion welded pipe for high temperature and high pressure service; alloy steel castings for valves, flanges and fittings for service at temperatures from 750 to 1100 degrees Fahr.; for the same temperature range, seamless alloy steel pipe, sheet copper-silicon alloy, copper-silicon alloy rods, bars, shapes, plates and sheets; magnesium base alloy ingot for remelting and magnesium base alloy die castings.

Extensive revisions have been incorporated in requirements for cold-rolled strip steel, black and hot-dipped zinc-coated welded and seamless steel pipe for ordinary uses; reinforced and nonreinforced concrete sewer pipe; timber piles; friction tape for general electrical use.

Two tables of contents and a subject index render easy access to any desired standard.

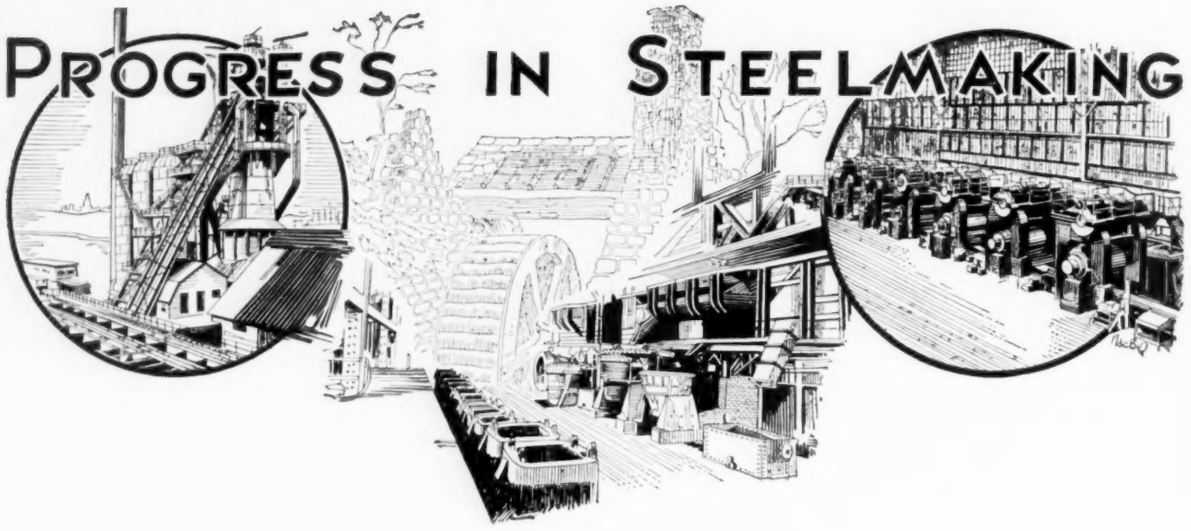
Non-Linear Time-Corrosion Relationship of Steel

In the paper by G. N. Schramm, E. S. Taylerson and Albert F. Stuebing, presented at the annual meeting of the American Society of Mechanical Engineers at New York, Dec. 4, 1934, and published in STEEL of Dec. 17, under the title "Low-Alloy High-Tensile Steels Provide Important Savings in Car Equipment," a statement was made that the authors believed the non-linear time-corrosion relationship of steel had not been pointed out previously. The attention of the authors has been directed to the fact that the non-linear time-corrosion relationship of steel was pointed out in an article by R. F. Passano, published in *Industrial and Engineering Chemistry*, for November 1933.

Develops Aluminum Flux

A new flux for welding sheet aluminum and alloy aluminum known as A. B. C. aluminum flux No. 8 has been developed by the Anti-Borax Compound Co., Fort Wayne, Ind.

PROGRESS IN STEELMAKING



Handles Tin Plate Skids

Four-inch skids on which tin plate now is being shipped are handled easily by a new lift truck known as a tin plate elevator. The unit in addition to having a single lift, compound lift and angle lift, is only 3½ inches high in the lowered position. It is capable of lifting loads of tin plate up to 3500 pounds a distance of 2¼ inches from the floor.

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Affords Reliable Results

Recent study of zinc-coated wires disclose that in using the Preece test the copper sulphate solution must be neutralized carefully, preferably with copper hydroxide rather than with copper oxide as commonly used. The surface must be cleaned thoroughly before the tests and between dips. Even with the proper precautions, zinc coatings applied by different methods dissolve at different rates, for which an allowance must be made in comparing results. With careful observance, however, this test will give reliable results for minimum thicknesses and distribution of zinc coatings.

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Coating Curtails Radiation Loss

INSULATING FURNACES FOR OPEN HEARTHS: Application of a 2-inch layer of insulating cement over the entire area of the checker chambers, end and side walls and roof of an open-hearth furnace has afforded an average saving in fuel of 21 per cent over a period of 1½ years. The first coat, which is shown in the accompanying illustration, was about ¼-inch thick. When this was dry three additional coats were applied, the last being trowelled to a smooth finish. Longer life of the refractory brick was obtained without evidence of spalling. Savings in fuel up to 20 gallons of oil per ton of steel melted are reported. The cement, which is manufactured by George F. Pettinos, Inc., Philadelphia, is used also for insulating industrial heating furnaces, boilers, ovens, pipes, coke oven bulkheads and forge furnaces

Operation More Uniform

Fuel consumption at an open-hearth shop in the Pittsburgh district has been reduced 7 to 20 per cent by the installation of furnace controls. Operation also is more uniform. While less steam is generated in the waste-heat boilers yet the steam pressure is more constant.

• • •

Light Coating Being Tried

To compete with sheet steel covered with a thin coating of copper for use in the manufacture of cans, several sheetmakers recently have been experimenting with the production of a light-coated terne plate with only a 2-pound coating. This material, it is claimed, can compete directly with electrolytically-coated copper plate, especially in the widening use for oil cans of quart to gallon capacity.

• • •

Mill Rolls Large Seamless

Seamless thick-walled tubes and hollow bodies with diameters up to 48 inches and in lengths up to 28 feet now are being rolled in Germany by a newly developed method. Plans for still heavier construction to roll hollow bodies up to 71 inches

diameter and 39½ feet long are being considered. The mill is built with numerous sets of rolls arranged radially to one another. The exterior rolls are mounted in a circular housing and are driven through pinions, while the interior rolls are carried by a mandrel head located on the inside of the cylinder being rolled. The axes of the rolls, which are provided with different grooves, lie somewhat inclined to the axis of the steel bloom so that the roll indentations on the bloom form helical lines inside and outside and the bloom is drawn through the mill automatically by the rolls. The first set of rolls produces a corrugation inside and outside that encircles the bloom in a helical line. The second and succeeding sets of rolls widen this corrugation still further until the swelling toward the end of the bloom is straightened out flat.

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Employs Counting Device

Rods, sheets, billets and pipe leaving the finishing stand of respective mills are being counted automatically at many plants by a photoelectric device.

• • •

Markets Blasting Nozzle

Borium blasting nozzles which afford a sand blasting operation of 300 hours, have been introduced. Each nozzle is built in two parts, an outer shell of mild steel and a borium insert.

• • •

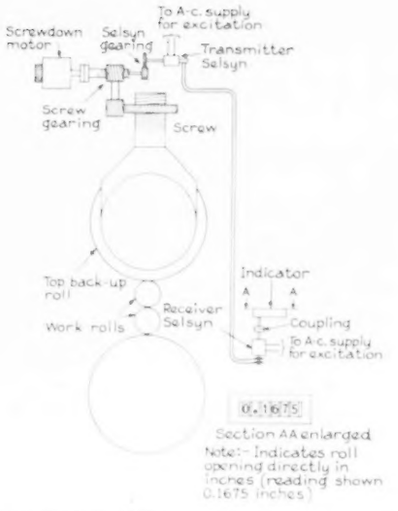
Produces Fibered Steel

Iron fibered steel is being produced by an English steelmaker for such commodities as boiler mountings, rivets, staples, drop bars and other commodities subject to jarring, vibration or sudden shocks. The product, which may be forged, welded, punched, flanged and machined possesses the strength of steel coupled with fibrous toughness of iron.

• • •

Permits Gases to Escape

Eliminating the piping in steel ingots is accomplished by the use of a fine dry powder, which retards cooling of the hot top metal, according to claims of the maker. Granting that secondary piping is caused by occluded gases, it follows that if the hot-top is kept open longer gases have a better chance to escape. This is the purpose of the product. It forms a fusible coating which can be disturbed without danger of its entering the steel. Physical and analytical properties of the steel are unaffected by the powder.



Schematic diagram of wrap counter for reversing cold strip mills

Device Indicates Roll Gap Directly in Inches

Screwdown indicators for rolling mills are operated conveniently by the Selsyn, one form of which is shown in the accompanying illustration. The transmitter Selsyn is so geared to the screw that the counter or indicator reads directly in inches the indicated roll opening.

Another form of indicator, as pointed out by F. Mohler, industrial engineering department, General Electric Co., Schenectady, N. Y. consists of a dial and two concentric pointers, similar to a clock face and hands. One pointer is connected through Selsyns to the right screw and the other through Selsyn to the left screw. The divergence between the pointers indicates the difference in position of the right and left screws, and the mean between the pointers gives the average indicated roll opening.

Reviews New Aspects of Steelmaking Practice

In the comparatively brief span of 35 years, or since the turn of the century, steelmaking in the open-hearth furnace has progressed from the embryonic stage to an industry capable of producing in excess of 30,000,000 tons of high-quality steel annually. This point was brought out by L. F. Reinartz, works manager, American Rolling Mill Co., Middletown, O., who addressed 200 members and guests of the Cleveland chapter of the American Society for Metals Jan. 7.

Mr. Reinartz, a pioneer steelmaker and chairman of the open-hearth committee of the A. I. M. M. E., related amusing incidents of the early days in steel mills such as the interment of a frozen ladle of metal because of the lack of equipment to handle it back into the furnace, and the subsequent disinterment of this corpse years later when equipment had been developed to handle it. He explained the important parts played in the drama of steelmaking by improved refractories, enlarged furnaces, perfection of auxiliary equipment, labor-saving devices and the advent of a higher type of personnel in mill jobs.

He described a late type of open hearth in which all valves have been eliminated by the use of two venturi stacks, each equipped with 100-horsepower motors and fans for forcing air through checkers and the furnace, and extracting waste gases.

With the development of precision control equipment and other devices such as the automatic machine for building up backwalls and frontwalls, open-hearth steelmaking has become an exact science, capable of supplying steel of unvarying quality and in a wide range of analyses and properties.

Previous to Mr. Reinartz' address, Col. Frank A. Scott, former chairman of the Warner & Swasey Co., Cleveland, and during the war chairman of the War Industries board, spoke on "The World in Arms." He declared a nation's strength in wartime could be measured by its capacity for producing iron and steel and fabricating these metals. Ranking leading nations according to their degree of preparedness for another war, he placed Japan first, France second, Italy third, England fourth, Germany fifth, United States sixth and Russia seventh.

Large Galvanizing Kettle

Penn Galvanizing Co., 2200 East Tioga street, Philadelphia, has installed a galvanizing kettle said to be the largest in the country. It will accommodate jobs up to and including steel plates used by shipbuilders in hull construction. It is 32½ feet long, 34 inches wide and 60 inches deep and 160 tons of molten zinc are required to fill it. It was designed after a survey of all jobs handled since the formation of the company had been completed. It makes possible the galvanizing of all pieces in one immersion, thus resulting in a galvanized coating of uniform thickness.

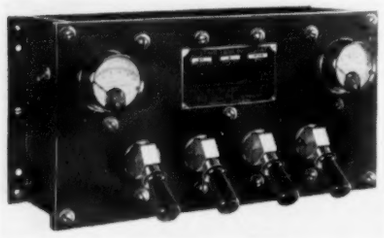
Bloomer Is Being Remodeled

Automatic handling tables serving the 4-stand continuous blooming mill at the Ford Motor Co., Dearborn, Mich. now are being remodeled. New approach tables and a new shear for cutting 10 x 10-inch blooms will be installed. The work is being executed by the Morgan Construction Co., Worcester, Mass.

NEW EQUIPMENT

PRODUCTION FABRICATION
TREATMENT FINISHING

Electroplating Rheostat — Udylite Co., 1651 East Grand boulevard, Detroit, has developed for all electroplating processes, a rheostat into which are incorporated features of close current regulation, ruggedness, compact construction, simplicity of operation and attractive appearance.



Udylite rheostat developed for all electroplating processes

The cam switch of the unit, shown herewith, is designed to provide perfect contact at the low plating voltages. This is ensured by grinding the switch leaves when the switch is in a closed position. Ample contact surface and current carrying capacity have been provided.

Contact pressure firmly holds each leaf perfectly flush against the bus bar without distortion. Pressure is always perpendicular to the contact surface. It is equalized on all leaves and is equally divided between the two contact surfaces. Inner and outer leaves are made of heavy spring bronze while the current carrying center leaves are of spring brush copper.

Leaves of the cam switch are actually multiple cleaning units. They provide a wiping action on the surface of the bus which keeps the contact surface clean and ensures positive contact at all times and at all points.

Ammeter and voltmeter are securely fastened on the front of the board where they are in full view of the operator. The ammeter shunt is located below the resistors, away from heat, ensuring reliability of instrument readings. A double throw, single pole, voltmeter switch is mounted on the rheostat to permit reading of the voltage drop across the tank and across the line.

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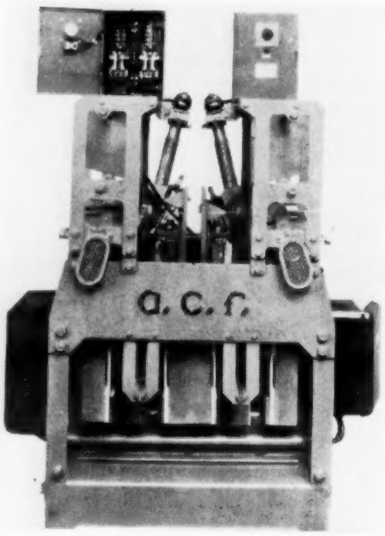
Electric Metal Heater — American Car & Foundry Co., 30 Church street, New York, recently introduced an electric metal heater for the heating of stock, which is cut to length, piled in the hopper, automatically fed between the copper jaws or electrodes, heated to the temperature for which electric eyes are set, and automatically released so that the piece falls out of the machine into a receptacle convenient to the operator on the upset or drop forge machine. This unit, shown herewith, will heat any diameter stock from ¼ to 1½-inch or larger, if desired, and will place the heat on the end or at any other point on the bar or piece.

Any size stock between 4 inches minimum and 19 inches maximum can be handled in this way, or longer stock can be fed into the heater, by hand, or the heater can be built to handle longer stock than this, if desired. The electric eye can be set



Electric metal heater introduced by American Car & Foundry Co.

to operate at any heat desired, simply by moving the dial handle on the front of the box at the top of the machine.

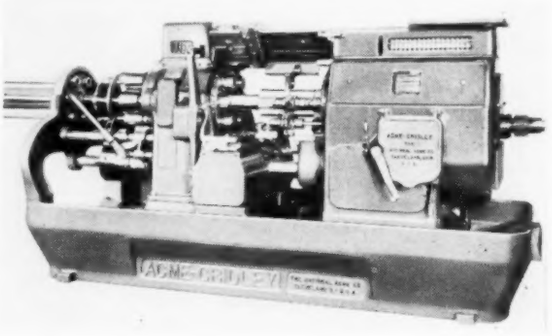
The capacity of the machine ranges from 1,200-pieces per hour on the 5/16-inch diameter stock, to 50-pieces per hour on the 1½-inch diameter stock, depending entirely upon the length of the heat, and the degree of heat desired. The electrical consumption per hundred pounds of heat is likewise dependent upon the temperature to which the stock is heated. On ordinary stock, at 1900 to 2000 degrees heat, 18-kilowatt horsepower per hundred pounds seems to be the average. This covers the poundage of heated metal, not the total weight of metal. The heater is equipped to operate on any alternating current voltage or cycle.

These heaters have a wide range of operation, working down to a 1-inch heat on a ¼-inch bar, and up to an 18 or 20-inch heat on a 1½ to 2-inch diameter bar.

• • •

Automatic Screw Machines—National Acme Co., 170 East 131 street, Cleveland, is bringing out a new line of six-spindle automatics, designated model "R," to supplement its four-spindle line announced last year. The machines are built on the same frames and are uniform in design so that an operator can run units of different sizes, four or six-spindle, in one group without confusion. So far as possible, machine parts, tooling and attachments have been made interchangeable, so as to reduce the investment required. Furthermore collets and pushers for corresponding sizes of machines are interchangeable. The new six-spindle model "R" machines are built in four capacities: 9/16, 1, 1¼ and 1⅝-inch. The 1¼-inch unit is shown herewith.

An important feature in the design of the new model is the arrangement or spacing of the spindles in the spindle carrier. The two spindles at the top and the two at the bottom are in line for direct application of tooling from the four heavy inde-



MODEL "R" six-spindle Gridley automatic screw machine designed by National Acme Co. The unit is arranged to thread in the third or fourth position, or both, in all sizes. The same slide and operating mechanism, in either position, can be used for accelerated reaming or turning operations

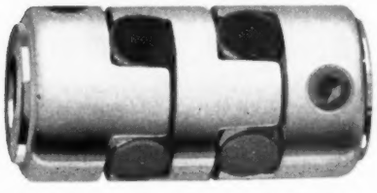
pendently operated cross slides. The two spindles at the sides (second and fifth positions) are accessible for a "short coupled" double deck tool holder or an independent cross slide if required. This feature of design makes the tooling of the machine extremely accessible and easy to adjust.

These machines are regularly provided with stock stop in the sixth position, but can be furnished when this is specified, with stock stop in first position. The stop is brought into position by mechanism that is entirely enclosed. It drops quickly out of the way after stock feeds out and the collet closes, making possible the use of tooling in the feed position. This makes all six positions working positions, and in combination with the four independent cross slides, makes this six spindle machine the equivalent of machines with a greater number of spindles.

Another feature of these machines is the stock reel and method of indexing it. The front disk of the stock reel turns in a reel guide which is mounted directly on the end of the frame and pan. The stock reel is indexed by power through shaft and gear from spindle carrier mechanism.

♦ ♦ ♦

Flexible Coupling—Lovejoy Tool Works, 5007 West Lake street, Chicago, recently introduced a flexible coupling, shown herewith, which is recommended for use of machines where quietness is essential, where there is vibration, and where there is difficulty in lining up the drive and driven units. It is being used by



Aluminum center unit employed in Lovejoy flexible coupling

manufacturers of oil burners, office devices, coin operated musical instruments, air conditioning units and similar equipment.

The new assembly has an aluminum center unit which has jaws facing in both directions but staggered. By using two spider cushions and a center unit, the coupling is given more length, quietness is improved and flexibility added. The coupling is made with shaft diameters up to and including one-half inch.

Motor-Driven Grab Bucket—Erie Steel Construction Co., Erie, Pa., has announced improved motor-driven grab buckets ranging from ½ to 3 cubic yards capacity for steel mills, foundries, power houses and material yards handling ore, limestone dolomite, slag, sand, cinder, clay, coal, and similar bulk materials. A direct current special Westinghouse control makes possible the use of only two conductors between the control cab and bucket.

Since each bucket carries its own motor, the buckets can be attached to cranes, monorail hoists, or any hoisting equipment at which electric power is available. After the hoist-

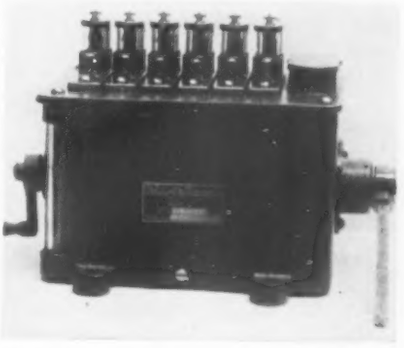
Motor-driven grab bucket announced by Erie Steel Construction Co.

block hook slips into the holding yoke of the bucket and an electrical connection is made by a simple plug device, the bucket is ready to go to work. Power is supplied either through a loop cable or a cable paid out from a light-weight drum—frequently spring operated. Since the unit is self-contained, there is no tendency to lift out of the material while closing and it digs itself in.

♦ ♦ ♦

Force Feed Lubricators — Hills-McCanna Co., 2349 Nelson street, Chicago, has introduced totally enclosed force feed lubricators for automatically supplying oil to bearing surfaces. These lubricators, shown herewith, are built in sight feed and blind feed models. In the sight feed lubricator a single plunger is employed to take the oil from the reservoir, measure it and force it to the delivery point. The plunger is actuated by a rocker arm traveling on an eccentric, the rocker arm driving the plunger in a straight line.

On the discharge stroke the oil is forced to the delivery point under



Hills-McCanna force feed lubricator built in sight and blind feed models

pressure and, at the same time, oil is drawn from the reservoir for the next delivery. On the down stroke the oil in the suction chamber is forced through the sight feed intake nozzle into the sight feed chamber and then admitted to the discharge side of the plunger, which is separate and apart from the suction side of the pump. The exact amount of oil passed to the sight feed is delivered at each stroke.

♦ ♦ ♦

Riveting Hammer — Cleveland Pneumatic Tool Co., 3734 East Seventy-eighth street, Cleveland, has brought out a hammer for riveting duralumin rivets. The unit, as shown herewith, is fitted with a pistol grip handle. Size B is recommended for driving dural rivets up

Riveting hammer for dural rivets, placed on the market by Cleveland Pneumatic Tool Co.

to ⅛-inch diameter. A thumb control throttle allows perfect regulation of the force of the blow. A simple retainer prevents the rivet set from falling out. Size M will drive dural rivets up to 3/16-inch diameter and can be used for light chipping.

♦ ♦ ♦

Test Plier—In the description of the test plier manufactured by Star Fuse Co. Inc., 235 Canal street, New York, on page 28, Dec. 31 issue of STEEL, the last sentence should have read: "The puller removes with ease all fuses from 10 to 200 amperes." This range was given inadvertently as 10 to 20 amperes.

Helical Gears In Retrospect

(*Concluded from Page 27*)

a new class of lubricant has become available generally referred to as the extreme-pressure class. These lubricants vary in their composition, but in general the best of them have the fluidity of oil combined with the protective value for gear teeth which is as great or greater than could be obtained with the old compounds. Most of them can be used for sleeve bearings, roller bearings and gear teeth. This has resulted in some simplification of heavy gear design because it is now satisfactory to use one lubricant for gears and bearings without any elaborate arrangement for separation of systems.

Some modern installations use oil in the same manner, but while oil is essential and satisfactory for high-speed gears with relatively light tooth loads, its use on heavy-duty slow speed gears requires larger proportions than would otherwise be necessary. The selection of lubricant and the method of lubricant have so much influence on the capacity of gears that they should be given careful consideration in the preparation of designs for important drives.

Heavy Loads Need Special Couplings

The selection of couplings is also of greatest importance. The ordinary characteristics of the so-called flexible coupling consist of ability to take care of a limited amount of misalignment without exerting axial strain on the connecting shaft. Most of the commercial couplings fulfill these functions with more or less efficiency, and where steady loads are to be transmitted, there is no special need to go further.

However, in the majority of heavy industrial applications, either the load or the driving impulses fluctuate more or less severely and conditions of shock exist which should not be ignored. The Falk-Bibby coupling originally was designed to meet these conditions. It is a spring coupling but its action is entirely different from that of an ordinary spring. In this coupling the springs exert progressive resistance to increments of torque, a feature which is invaluable for the protection of the gears and other parts of the equipment. The total angular deflection of the springs is not large and may not exceed 1 to 2 degrees under extreme impacts, but it is capable of reducing peak stresses to a relatively small fraction of their value when the connections are torsionally rigid. Where a gear train is included in the transmission, the most effective location for a coupling of this kind is on the low speed side because the angular deflection of the coupling is multiplied by the gear ratio.

The use of springs, air cushions, and shock absorbers is so essential to the satisfactory operation of vehicles of all kinds that we have learned to accept them without question because they appeal directly to our senses. The necessity for protection against torsional shock is just as real but, unfortunately, we can only recognize its effects because it cannot be seen or felt.

New Trade Publications

LUBRICATION — Acheson Colloids Corp., Port Huron, Mich., in Bulletin No. 220 treats of graphoid surfaces and the part they play in lubrication.

DIE CASTINGS—Chicago Die Casting Mfg. Co., 2512 West Monroe street, Chicago, has published a bulletin giving specifications on a number of its die-cast products.

BALL BEARINGS — A booklet by the New Departure Mfg. Co., Bristol, Conn., describes self-sealed, self-lubricated ball bearings, some lubricated for life.

WELDING MACHINES—Arc welding machines manufactured by Wilson Welder & Metals Co. Inc., distributed by Air Reduction Sales Co. are described in a recent bulletin.

PUMPS — Worthington Pump & Machinery Corp., Harrison, N. J., has issued bulletins on its types L, LA and LC single-stage volute centrifugal pumps, No. 3 to 12.

SAND BLAST — Bulletin No. 32 by the Ruemelin Mfg. Co., 1574 South First street, Milwaukee, describes its sand blast cabinets, especially its type AT and AG cabinets.

GAS BURNERS — Selas Co., Philadelphia, in a current bulletin presents claims of its gas burners for use in metallurgical operations, with illustrations and full description.

RUST RESISTANCE — A folder by the Republic Steel Corp., Youngstown, O., explains reasons for the rust-resistant qualities of Toncan iron. It is issued as Bulletin No. Adv. 132.

WELDERS—Engine-driven shielded arc welders of types SA300 and SA400 are described in Bulletins No. 304 and 305 by the Lincoln Electric Co., Cleveland. Both are illustrated and contain full data on the welders.

STEEL — Horace T. Potts Co., Philadelphia, has issued the nineteenth edition of its steel handbook, containing technical information on heat treating, purpose charts, analyses of S. A. E. steels, extra lists, weights and other data.

POLISHING—Abrasive Co., Philadelphia, has issued a folder on its Borolon polishing grain. It is pointed out that the capillarity or high glue absorption of the grain, and its roughened surface, gives a strong bond with the glue so that the grain holds fast to the wheel.

MOTORS — Imperial Electric Co., Akron, O., has issued its Bulletin No. 1020, illustrating application of motors to various types of drives, giving reasons why the small manufacturer of motors can give specialized service on such drive problems and presenting a condensed survey of the company's line.

TURRET LATHES—Jones & Lamson Machine Co., Springfield, Vt., has issued a catalog of its ram-type universal turret lathes, illustrated and fully describing the lathes. It includes specifications, illustrations of each tool and description of its use.

DEAERATING HEATERS — Cochrane Corp., Philadelphia, in Bulletin No. 700 describes its deaerating heaters for freeing boiler feed water of air to limit oxidation of steel and iron in tubes and other parts. It is well illustrated and the theory and practice of deaerating is fully described.

CONTROLLERS—A looseleaf catalog covering its products has been issued by the Monitor Controller Co., Baltimore, containing bulletins on contractors, starters, controllers, push-button stations and other electrical devices. It is marginal indexed and conveniently arranged.

MOLDING MACHINES — Herman Pneumatic Machine Co., Union Bank building, Pittsburgh, has presented a bulletin on its pitless jar rollover and pattern drawing molding machines of 1500 pounds capacity. Construction and operating features are presented by a sectional drawing. Specifications of this type of machine with turnover plate of four sizes are included.

ELECTRICAL EQUIPMENT — Recent bulletins by General Electric Co., Schenectady, N. Y., include: No. GEK-86 on metal-enclosed switchgear; GEA-2024, 2044 and 1450-B on turbines for mechanical drive; GEA-1327A on indoor disconnecting switches; GEA-1585A on high-voltage magnetic switches and GEA-1137B on indoor A. C. cubicle switchgear.

MULTTIPLES — Timken Steel & Tube Co., Canton, O., is distributing a booklet entitled, "Multiples at a Glance." It contains tables showing how long stock must be to furnish a definite number of multiples or how many multiples can be cut from a given length of stock. The tables cover multiples up to 50 in number, from 1 to 60 inches, including common fractions to 1/64th inch.

MEEHANITE — Meehanite Metal Corp., Pittsburgh, has published a series of bulletins in which features of Meehanite are developed. The first bulletin is entitled "The Engineers Investigate Meehanite" and compares physical properties and production problems of Meehanite with other cast metals. Three bulletins by the Meehanite Research institute deal with castings advancement, casting design, and die materials. The latter includes a table of performance data on Meehanite dies.

Steel Industry in Profit Area, with Rate 45½

Sheet Mills Average 60; Tin Plate 50; Three More Blast Furnaces Lighted; Scrap in Another Rise; More Work Forcing Equipment Renewals

UP 3 points last week to 45½ per cent, steelworks operations have re-entered the profit zone.

Last year the rate did not reach this point until March, and did not remain above 45 per cent except through the second quarter, when the industry made a rapid, though temporary, financial recovery.

Not only ingot production, but also output of finished steel is strongly upward. Some steel producers booked more finished steel in the first ten days this month than in all of January last year.

Sheet mill operations have risen to an average of 60 per cent, strip mills close to this figure; tin plate to 50 per cent. The nut and bolt industry is at 45 per cent. Some sheet mills working at capacity for the automobile industry are allotting tonnage to their customers, as in 1929. Scrap prices in the Middle West have made another sharp advance, extending a two-month upward trend.

Shortly, with the approach of spring, it will be demonstrated whether demand from the leading consumers outside the automobile industry is to be propped mainly by government spending as in 1934, or whether the improvement in fact is strengthening private initiative.

The big farm market for steel products this year is a reflex of government aid last year. The new four-billion dollar federal public works program presents this difference—it emphasizes relief through work, meaning more material and equipment.

Heavier Production Revealing Weak Spots in Equipment; Labor Truce Still Sought

With increasing manufacturing operations, the need for replacing outworn equipment is becoming strong enough to overcome even some of the hesitancy engendered through uncertain government policies. Many purchases in the current iron and steel markets are for requirements to facilitate production; it is obvious that a fair start on rebuilding the industrial machine will be an important factor in steel demand.

Action of the steel labor board in ordering employe representative elections at Carnegie, Illinois Steel and Youngstown Sheet & Tube plants, the consequent suit filed by the Carnegie employes' association contesting the order, presumably to be followed by similar action by Illinois and Sheet & Tube employes, is not considered evidence of a final break between steel employers and the union labor group. Department of labor officials continue to negotiate for a truce.

Possibly as a protection against interruptions, automobile manufacturers are bringing strong pressure to bear for steel. Automobile output last week, 59,000, compares with 42,000 in the preceding week. The Ford schedule for this month, 100,000 cars, may fall short of this through inability to obtain sufficient bodies.

Railroads To Finance More of Their Purchases; 37-Cent Rise in STEEL'S Scrap Composite

Rail tonnage in prospect at this time is far less impressive than in 1934. About 150,000 tons are marked for early award, which the carriers themselves will finance. Southern Pacific is inquiring for 26,740 tons. December domestic freight car purchases, 110, brought the total for the year to 23,829, largest since 1930. Relaying rails have been reduced $1 a ton.

Structural shape awards dropped to 9246 tons, practically all public work. On some small orders for cast pipe for public projects, scheduled prices were reduced $2 a ton.

Two more blast furnaces have been blown in in the Pittsburgh district, one at Lorain, O. Pig iron shipments in the Middle West this month are 40 per cent ahead of the comparable period in December.

Steelworks operations last week advanced 2 points to 27 per cent at Pittsburgh; 2½ to 26, eastern Pennsylvania; 5 to 33½, Birmingham; 5 to 82, Cleveland; 4 to 84, Wheeling; 3 to 56, Youngstown. Chicago held at 49; Detroit 59; New England 68; Buffalo 39.

Daily average steel ingot production in December, 77,645 gross tons, was 27 per cent over November; total for the month, 1,941,127 tons, up 22 per cent. Output for the year, 25,260,570 tons, was 11.8 per cent above 1933.

STEEL'S iron and steel price composite has advanced 6 cents to $32.57, reflecting the rise in scrap. Finished steel index remains $54, while the scrap composite is $12.08, up 37 cents.

COMPOSITE MARKET AVERAGES

	Jan. 12	Jan. 5	Dec. 29	One Month Ago Dec., 1934	Three Months Ago Oct., 1934	One Year Ago Jan., 1934	Five Years Ago Jan., 1930
Iron and Steel	$32.57	$32.51	$32.46	$32.39	$32.10	$31.15	$35.19
Finished Steel	54.00	54.00	54.00	54.00	54.00	51.10	55.63
Steelworks Scrap	12.08	11.71	11.54	11.02	9.40	11.24	14.16

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip and cast iron pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Jan. 12, 1935	Dec. 1934	Oct. 1934	Jan. 1934
Finished Material				
Steel bars, Pittsburgh	1.80	1.80	1.80	1.75
Steel bars, Chicago	1.85	1.85	1.85	1.80
Steel bars, Philadelphia	2.09	2.09	2.09	2.04
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.60
Shapes, Pittsburgh	1.80	1.80	1.80	1.70
Shapes, Philadelphia	2.00½	2.00½	2.00½	1.90½
Shapes, Chicago	1.85	1.85	1.85	1.75
Tank plates, Pittsburgh	1.80	1.80	1.80	1.70
Tank plates, Philadelphia	1.98½	1.98½	1.98½	1.88½
Tank plates, Chicago	1.85	1.85	1.85	1.75
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.75
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.25
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	2.85
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.85
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.35
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	2.95
Plain wire, Pittsburgh	2.30	2.30	2.30	2.20
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.35
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$28.00	28.00	28.00	26.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	26.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	26.00
Wire rods, Pittsburgh	38.00	38.00	38.00	36.00

	Jan. 12, 1935	Dec. 1934	Oct. 1934	Jan. 1934
Pig Iron				
Bessemer, del. Pittsburgh	19.76	19.76	19.76	19.26
Basic, Valley	18.00	18.00	18.00	17.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	18.76
No. 2 foundry, del. Pittsburgh	19.26	19.26	19.26	18.76
No. 2 foundry, Chicago	18.50	18.50	18.50	17.50
Southern No. 2, Birmingham	14.50	14.50	14.50	13.50
No. 2X eastern, del. Philadelphia	20.63	20.63	20.63	19.63
Malleable, Valley	18.50	18.50	18.50	17.50
Malleable, Chicago	18.50	18.50	18.50	17.50
Lake Superior charcoal, del. Chi.	24.04	24.04	23.54	23.54
Gray forge, del. Pittsburgh	18.63	18.63	18.80	18.38
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	90.24
Scrap				
Heavy melting steel, Pittsburgh	$13.25	12.95	10.50	13.05
Heavy melt. steel, No. 2, east. Pa.	9.75	9.30	8.00	9.40
Heavy melting steel, Chicago	12.75	10.55	8.75	10.45
Rails for rolling, Chicago	13.25	11.65	8.90	11.25
Railroad steel specialties, Chicago	13.75	11.90	9.75	11.30
Coke				
Connellsville, furnace, ovens	3.60	3.60	3.60	3.60
Connellsville foundry, ovens	4.60	4.60	4.60	4.25
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.85c
Gary, base	1.95c
Chicago, del.	1.98c
New York, del.	2.18c
Philadelphia, del.	2.14c
Birmingham, base	2.00c
St. Louis, del	2.17c
F.o.b. cars, dock, Pacific ports	2.40c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.40c
Gary, base	2.50c
Chicago, del.	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham, base	2.55c
St. Louis, del.	2.72c
F.o.b. cars, dock, Pacific ports	3.05c

GALVANIZED No. 24

Pittsburgh, base	3.10c
Gary, base	3.20c
Chicago, del.	3.23c
Philadelphia, del.	3.39c
New York, del.	3.43c
Birmingham, base	3.25c
St. Louis, del.	3.42c
San Fran'co, f.o.b. cars, dock	3.70c

TIN MILL BLACK No. 28

Pittsburgh, base	2.75c
Gary, base	2.85c
St. Louis, del.	3.07c

COLD ROLLED No. 10

Pittsburgh, base	2.50c
Gary, base	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.79c
New York, del.	2.83c
F.o.b. cars, dock, Pacific ports	3.10c

COLD ROLLED No. 20

Pittsburgh, base	2.95c
Gary, base	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.24c
New York, del.	3.28c

ENAMELING SHEETS

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher.

Tin plate, coke base contract	$5.25
Do., waste waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat Resistant Alloys

Pittsburgh, base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh, base	1.80c
New York, del.	2.08c
Philadelphia, del.	1.98½c
Boston, del.	2.20c
Buffalo, del.	2.03½c
Chi. or Gary base	1.85c
Cleveland, del.	1.98½c
Birmingham, base	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific Coast, f.o.b. cars, dock	2.35c
St. Louis, del.	2.07c

Structural Shapes

Pittsburgh, base	1.80c
Philadelphia, del.	2.00½c
New York, del.	2.05½c
Boston, del.	2.18½c
Bethlehem, base	1.90c
Chicago, base	1.85c
Cleveland, del.	1.98½c
Buffalo, base	1.90c
Gulf ports	2.20c
Birmingham, base	1.95c
Pacific Coast, f.o.b. cars, dock	2.35c

Bars

SOFT STEEL

Pittsburgh, base	1.80c
Chicago or Gary	1.85c
Duluth, base	1.95c
Birmingham, base	1.95c
Cleveland, base	1.85c
Buffalo	1.90c
Detroit, del.	1.95c
Pacific Coast ports cars, dock, c.i.f.	2.35c
Philadelphia, del.	2.09c
Boston, del.	2.20c
New York, del.	2.13c
Pitts., forg. qual.	1.95c-2.05c

RAIL STEEL
To Manufacturing Trade

Pittsburgh, base	1.70c
Chicago or Gary, base	1.75c
Moline, Ill., base	1.75c
Cleveland, base	1.75c
Buffalo, base	1.80c

IRON

Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia, base	1.89c
Pittsburgh, refined	2.75-7.50c

REINFORCING

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.34c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh, base	1.90c
Chicago, Buffalo, Cleveland, Birm., Young	1.95c
Gulf ports	2.30c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pitts.-Cleve. 100 lb. keg

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting □ □

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs and over	1.97½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot) □

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo 0.50
4600 0.20 to 0.30 Mo. 1.25 1.75 Ni. 1.05
5100 0.80-1.10 Cr 0.45
5100 Cr. spring base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van 1.50
Carbon Van. 0.95
9250....Carbon base plus extras

Piling □ □

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops □

Hot strip to 23⅝-in.

Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base,	2.00c
Detroit, delivered	2.05c
Phila., delivered	2.14c
New York, del.	2.18c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material □

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
* 21-45 lbs.	$26.00
* 50-60 lbs.	$23.00
* 70-75 lbs.	$20.00
* 80-85 lbs.	$24.00
* 100 lbs.	$25.00
Light Rails billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	$34.00
Angle bars, mills	2.55c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	70-10-10 off
Rolled thread, ½ x 6 and smaller	70-10-10 off

MACHINE BOLTS

All sizes, cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts,	70-10-10 off
Tire bolts	60-10 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch	
Rolled thread machine bolts, ½ x 6 and smaller	70-10-10 off
Step bolts	70-10 off
Elevator bolts	70-10 off

NUTS

S.A.E. semifinished hex.; ½ to ⅞-inch	70-10-10 off
Do., ½ to 1-inch	70-10-10 off
Do., over 1-inch	70-10 off

HEXAGON CAP SCREWS

Milled	85 off
Upset, 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in. small	70-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago ⅞-in. and smaller,	3.00c
Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila.	6.25 off

Cut Nails □ □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads, Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

In.	Steel Blk.	Steel Gal.
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD

	Steel	
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

	Steel
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	
⅛—1½ inch, black and galv. take 4 pts, over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.	

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

SEAMLESS BOILER TUBES

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$38.00-39.00
4-in., Birmingham	41.00-42.00
4-in., Chicago	49.00-50.00
6 to 24-in., Chicago	46.00-47.00
6-in. & over, east fdy.	42.00
Do., 4-in.	45.00

Class A pipe $2 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel □

BILLETS AND BLOOMS

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.30
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, O., and Sparrows Point, Md.	28.00

SLABS

Pitts., Cleve., Young.	27.00

WIRE RODS

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

SKELP

Pitts., Chicago	1.70c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville, fur.	$3.60- 3.85
Connellsville, fdry.	4.60
Connel. prem. fdry.	5.10
New River fdry.	6.00
Wise county fdry	4.45- 5.25
Wise county fur.	4.00- 4.50

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.50
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots

	Spot
Pure benzol	15.00c
90 per cent benzol	15.00c
Toluol	30.00c
Solvent naphtha	26.00c
Commercial xylol	26.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

†Naphthalene flakes and balls, in bbl.	5.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25; 50-cent differentials apply to any grade below 1.75. Gross tons.

BASING POINTS:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Granite City, Ill.	18.50	18.50	18.00	.....
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
DELIVERED FROM BASING POINTS:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.02	.....	19.90	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.77	22.27	.....	.....
Brooklyn, N. Y., from Bmgham.	21.39	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham,	19.13	.....	19.01	.....
Cleveland from Birmingham	18.62	.....	18.50	.....
Indianapolis from Hamilton, O.	20.77	20.77	20.27	21.27
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.50	19.50	19.00	20.00
Muskegon, Mich., from Chicago, Toledo or Detroit	21.40	21.40	20.90	21.90
Newark, N. J., from Birmingham	20.51	.....	.....	.....
Newark, N. J., from Bethlehem.	20.89	21.39	.....	.....
Philadelphia from Birmingham.	19.88	.....	19.76	.....
Philadelphia from Swedeland, Pa.	20.26	20.76	19.76	.....
Pittsburgh district from Neville Island	(Neville Island base, plus 63c, 76c and $1.13 switching chgs.)			
Saginaw, Mich., from Detroit	20.60	20.60	20.10	21.10
St. Louis from Granite City, Ill.	19.00	19.00	18.50	.....
St. Louis from Birmingham	18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

LOW PHOS.

Basing Points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.50. Basing Point:

Philadelphia, standard and copper bearing 24.63

GRAY FORGE		CHARCOAL	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.04

SILVERY†

Jackson County, O., base; 6%—$22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, $1.25 higher.

BESSEMER FERROSILICON†

Jackson County, O., base, 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbes.	4.65

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.,	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-18.50

Manganese Ore

(*Nominal*)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK

First Quality.

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	45.00
Second Quality	
Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00
Ohio	
First quality	$40.00
Intermediary	36.00
Second quality	25.00

MALLEABLE BUNG BRICK

All bases	50.00

SILICA BRICK

Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00

MAGNESITE

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases	40.00
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash.	22.00

BASIC BRICK

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$19.50
Washed gravel f.o.b. Ill., Ky., net ton, carloads	$15.50-16.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
Do., Balti. base	85.00
Do., del. Pittsburgh	89.79
Spiegeleisen, 19-20% dom. fur. spot†	26.00
Ferrosilicon, 50% freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent	126-130.00

Spot, $5 a ton higher.

Silicomang., 2½ carb.	90.00
2% carbon, 95.00; 1%, 105.00	
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt. allow., lb.	7.00
do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage	42.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	55.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper.

Sheets

Yellow brass (high)	14.25
Copper, hot rolled	16.00
Lead, cut, to jobbers	7.25
Zinc, 100-lb. base	9.50

Tubes and Pipes

High yellow brass	16.00
Seamless copper	16.25

Rods

High yellow brass	12.75
Copper, hot rolled	13.25

Anodes

Copper, untrimmed	13.75

Wire

Yellow brass (high)	14.75

Old Metals

Deal. buying prices, cents lb.

No. 1 Composition Red Brass

New York	4.37½-4.62½
Chicago	4.37½-4.62½
*Cleveland	4.75- 5.00
*St. Louis	4.75- 5.00

Heavy Copper and Wire

New York	5.75- 6.00
Chicago, No. 1	5.50- 5.75
*Cleveland	5.25- 5.50
*St. Louis	5.50- 5.65

Composition Brass Borings

New York	3.87½-4.12½

Light Copper

New York	4.50- 4.75
*Chicago	4.25- 4.50
*Cleveland	4.50- 4.75
*St. Louis	4.75- 5.00

Light Brass

Chicago	2.25- 2.50
Cleveland	2.50- 2.75

Lead

New York	2.75- 2.85
Cleveland	2.75- 3.00
Chicago	2.62½-2.87½
St. Louis	2.75- 2.90

Zinc

New York	1.75- 2.00
Cleveland	1.75- 2.00
St. Louis	2.40- 2.50

Aluminum

Borings, Cleveland	7.50- 8.00
*Mixed, cast, Clev.	12.25-12.75
Mixed, cast, St. L.	12.00-12.50
*Clips, soft, Clev.	13.50-14.00

Secondary Metals

Brass ingot, 85-5-5-5	8.25
Stand. No. 12 Alum.	16.00

Iron and Steel Scrap Prices

Corrected to Friday night Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.00- 9.50
Boston, dock, expt.	8.75- 9.00
Boston, domestic	6.75- 7.25
Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	10.00-10.50
Chicago, No. 1	12.50-13.00
Cleveland, No. 1	11.00-11 50
Cleveland, No. 2	10.50-11.00
Detroit, No. 1	9.50-10.00
Detroit, No. 2	8.50- 9.00
Eastern Pa.	11.00
Eastern Pa., No. 2	9.50-10.00
Federal, Ill.	8.50- 9.00
Granite City, R. R.	9.50-10.00
Granite City, No. 2	7.50- 8.00
N. Y., deal. No. 2	7.00- 7.25
N. Y., deal. R. R.	8.50- 8.75
Pittsburgh, No. 1	13.00-13.50
St. Louis	8.00- 8.50
Valleys, No. 1	13.00-13.50

COMPRESSED SHEETS □

Buffalo, dealers	10.00-10.50
Chicago, factory	11.75-12.25
Chicago, dealer	10.50-11.00
Cleveland	11.00-11.50
Detroit	10.00-10.50
E. Pa., new mat.	10.0-10.50
Pittsburgh	13.00-13.50
St. Louis	7.00- 7.50
Valleys	12.50-13.00

BUNDLED SHEETS □ □

Buffalo	7.50- 8.00
Cincinnati, del.	7.00- 7.50
Cleveland	8.50- 9.00
Pittsburgh	12.00-12.50
St. Louis	5.00- 5.50

SHEET CLIPPINGS, LOOSE □

Chicago	6.00- 6.50
Cincinnati	6.50- 7.00
Detroit	5.00- 5.50
St. Louis	5.00- 5.50

STEEL RAILS, SHORT □

Birmingham	12.00-12.50
Buffalo	12.50-13.00
Chicago (3 ft.)	13.50-14.00
Chicago (2 ft.)	14.50-15.00
Cincinnati, del.	12.50-13.00
Detroit	12.00-12.50
Pitts., open-hearth, 3 ft. and less	15.00-15.50
St. Louis, 2 ft. & less	12.50-13.00

STEEL RAILS, SCRAP □

Boston	6.75- 7.00
Chicago	12.50-13.00
Pittsburgh	13.50-14.00

STOVE PLATE □ □

Birmingham	6.00- 6.50
Boston, dealers	3.25- 3.75
Buffalo	9.00- 9.50
Chicago, net	7.00- 7.50
Cincinnati, dealers	6.50- 7.00
Detroit, net	6.00- 6.50
Eastern Pa.	9.00
N. Y., deal. fdry.	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	12.50-13.00
Chicago, springs	13.50-14.00
Eastern Pa.	14.00-14.50
Pittsburgh	15.00-15.50
St. Louis	10.50-11.00

ANGLE BARS—STEEL □

Chicago	13.00-13.50
St. Louis	10.75-11.25

RAILROAD SPECIALTIES

Chicago	13.50-14.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	12.50-13.00
Cleveland, billet, bloom crops	15.00-15.50
Eastern Pa., crops	15.00-15.50
Pittsburgh, billet, bloom crops	15.00-15.50
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES □ □

Chicago	12.50-13.00
St. Louis, cut	10.50-11.00

SHOVELING STEEL □ □

Chicago	12.50-13.00
Federal, Ill.	8.50- 9.00
Granite City, Ill.	7.50- 8.00

RAILROAD WROUGHT □

Birmingham	7.50- 8.00
Boston, dealers	6.00- 6.50
Buffalo, No. 1	8.50- 9.00
Buffalo, No. 2	11.00-11.50
Chicago, No. 1, net	11.00-11.50
Chicago, No. 2	12.50-13.00
Cincinnati, No. 2	9.00- 9.50
Eastern Pa.	11.50-12.00
N. Y., No. 1, deal.	7.00- 7.50
St. Louis, No. 1	7.00- 7.50
St. Louis, No. 2	9.50-10.00

SPECIFICATION PIPE □

Boston	3.00- 3.25
Eastern Pa.	9.00- 9.50
New York, dealers	3.50- 4.00

BUSHELING □ □

Buffalo, No. 1	10.00-10.50
Chicago, No. 1	10.75-11.25
Cinci., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	7.50- 8.00
Detroit, No. 1, new	8.50- 9.00
Valleys, new, No. 1	12.50-13.00

MACHINE TURNINGS □

Birmingham	4.50- 5.00
Boston, dealers	1.75- 2.00
Buffalo	5.00- 5.50
Chicago	6.50- 7.00
Cincinnati, dealers	4.50- 5.00
Cleveland	7.50- 8.00
Detroit	5.50- 6.00
Eastern Pa.	6.00- 6.50
New York, dealers	3.00- 3.50
Pittsburgh	8.75- 9.25
St. Louis	3.50- 4.00
Valleys	9.75-10.25

BORINGS AND TURNINGS □

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Cincinnati, dealers	4.50- 5.00
Cleveland	7.50- 8.00
Detroit	5.75- 6.25
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	6.50- 7.00

CAST IRON BORINGS

Birmingham, plain	4.50- 5.00
Boston, chemical	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	5.50- 6.00
Chicago	6.50- 7.00
Cincinnati, dealers	4.00- 4.50
Cleveland	7.50- 8.00
Detroit	5.75- 6.25
E. Pa., chemical	12.00-13.00
New York, dealers	1.50- 1.75
Pittsburgh	6.50- 7.00
St. Louis	3.00- 3.50

PIPE AND FLUES □ □

Cincinnati, dealers	5.50- 6.00

RAILROAD GRATE BARS □

Buffalo	6.50- 7.00
Chicago, net	6.25- 6.75
Cincinnati	5.50- 6.00
Eastern Pa.	9.00
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS □ □

Boston, dealers	5.75- 6.00
Buffalo	9.00- 9.50
Cleveland	9.50-10.00
Detroit	8.00- 8.50

FORGE SCRAP □ □

Boston, dealers	5.00- 5.25
Chicago, heavy	13.50-14.00
Eastern Pa.	9.50-10.00

ARCH BARS, TRANSOMS

St. Louis	12.25-12.75

AXLE TURNINGS □ □

Boston, dealers	3.00- 3.50
Buffalo	7.00- 7.50
Chicago, elec. fur.	11.00-11.50
Cleveland	7.50- 8.00
Eastern Pa.	9.50-10.00
St. Louis	6.50- 7.00

STEEL CAR AXLES □ □

Birmingham	12.50-13.00
Boston, ship. point.	10.00-10.50
Buffalo	12.50-13.00
Chicago, net	16.50-17.00
Eastern Pa.	16.50-17.00
St. Louis	14.00-14.50

SHAFTING □ □

Boston, ship. point.	12.25-12.50
Eastern Pa.	17.00
New York, dealers	10.75-11.25
St. Louis	11.50-12.00

CAR WHEELS □ □

Birmingham	9.00- 9.50
Boston, iron deal.	6.00- 6.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.00-12.50
Chicago, iron	12.00-12.50
Chicago, rolled steel	13.50-14.00
Cincinnati, iron	9.00- 9.50
Eastern Pa., iron	10.50-11.00
Eastern Pa., steel	14.00-14.50
Pittsburgh, iron	12.50-13.00
Pittsburgh, steel	15.00-15.50
St. Louis, iron	8.75- 9.25
St. Louis, steel	10.50-11.00

No. 1 CAST SCRAP □ □

Birmingham	9.50-10.00
Boston, No. 2	6.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	10.00-10.50
Buffalo, mach.	11.25-11.75
Chicago, agri. net	9.50-10.00
Chicago, auto	11.00-11.50
Chicago, mach. net	11.50-12.00
Chicago, railr'd net	10.50-11.00
Cinci., mach. cup	9.50-10.00
Cleveland, cupola	12.50-13.00
Detroit, net	9.50-10.00
Eastern Pa., cupola	11.00-11.50
Pittsburgh, cupola	13.50-14.00
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	9.00- 9.50
St. L., No. 1 mach.	10.25-10.75

HEAVY CAST □ □

Boston, del.	5.75- 6.00
Buffalo, break.	9.00- 9.50
Cleveland, break.	9.00- 9.50
Detroit, auto net	10.50
Detroit, auto net	9.50-10.00
Eastern Pa.	10.50
N. Y. break. deal.	6.50- 6.75
Pittsburgh	12.50-13.00

MALLEABLE □ □

Boston, consum.	10.00-10.50
Buffalo	11.50-12.00
Chicago, R. R.	13.50-14.00
Cincinnati, agri. del.	9.00- 9.50
Cleveland, rail	12.00-12.50
Detroit, auto	11.00-11.50
St. Louis, R. R.	10.50-11.00
Eastern Pa., R. R.	11.00-11.50

RAILS FOR ROLLING □

5 feet and over

Birmingham	10.00-10.50
Boston, dealers	8.00- 8.50
Buffalo	11.00-11.50
Chicago	13.00-13.50
Eastern Pa.	12.50-13.00
New York, dealer	7.50- 8.00
St. Louis	11.00-11.50

LOCOMOTIVE TIRES □

Chicago (cut)	13.50-14.00
St. Louis, No. 1	10.00-10.50

LOW PHOS. PUNCHINGS □

Buffalo	12.50-13.00
Chicago	14.00-14.50
Eastern Pa.	14.50-15.00
Pittsburgh	14.50-15.00

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin New York: Spot	Straits Tin New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Jan. 4	9.00	9.12½	7.50	50.65	50.70	3.70	3.55	3.72½	*19.00	13.75	35.00
Jan. 5	9.00	9.12½	7.50	50.65	50.70	3.70	3.55	3.75	*19.00	13.75	35.00
Jan. 7	9.00	9.12½	7.50	50.55	50.55	3.70	3.55	3.75	*19.00	13.75	35.00
Jan. 8	9.00	9.12½	7.50	50.85	50.77½	3.70	3.55	3.75	*19.00	14.00	35.00
Jan. 9	9.00	9.12½	7.50	51.25	51.10	3.70	3.55	3.75	*19.00	14.50	35.00
Jan. 10	9.00	9.12½	7.50	51.12½	51.00	3.70	3.55	3.75	*19.00	14.50	35.00
Jan. 11	9.00	9.12½	7.50	51.00	50.85	3.70	3.55	3.75	*19.00	14.50	35.00

*Nominal range 19.00c to 21.00c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.90c
Boston††	2.95c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.15c
Cleveland	2.95c
Detroit	3.03½c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.30c
New York‡(d)	3.22c
Pittsburgh(h)	2.90c
Philadelphia*	2.90c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.00c
Chicago	2.75c
Cincinnati	3.15c
New York‡(d)	3.32c
Philadelphia*	2.90c
St. Louis	3.19c
Tulsa	3.25c

REINFORC. BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland(c)	1.97½c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.15c
New Orleans	3.50c
Pitts., plain(h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	3.50c
St. Louis	3.24c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES	
Baltimore*	3.90c
Boston††	3.17c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland	3.31c
Detroit	3.40c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

PLATES	
Baltimore*	2.90c
Boston††	3.18c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.40c
Cleveland, ¼-in. and over	3.31c
Detroit	3.40c
Detroit, 3/16-in.	3.65c
Houston	3.00c
Los Angeles	3.70c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.95c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	
Baltimore*	3.05c
Boston††	3.25c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.00c
Cincinnati	3.20c
Cleveland	3.11c
Det., 8-10 ga.	3.13½c
Houston	3.35c
Los Angeles	3.80c
New Orleans	3.55c
New York	3.27c
Portland	3.75c
Philadelphia*	3.05c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	
Baltimore*†	3.51c
Boston (g)	3.90c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.05c
Cleveland	3.91c
Detroit	3.98½c
Los Angeles	4.45c
New York	3.85c
Philadelphia*†	3.55c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	
Baltimore*†	4.21c
Buffalo	4.00c
Boston (g)	4.60c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.70c
Cleveland	4.61c
Detroit	4.70c
Houston	4.40c
Los Angeles	5.05c
New Orleans	4.95c
New York	4.50c
Philadelphia*†	4.25c
Pitts.** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c

BANDS	
Baltimore*	3.15c
Boston††	3.25c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.45c
Cleveland	3.36c
Detroit, 7/8-in. and lighter	3.38½c
Houston	3.25c
Los Angeles	3.90c
New Orleans	3.59c
New York(d)	3.62c
Philadelphia	3.15c
Pittsburgh(h)	3.20c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c

HOOPS	
Baltimore	2.30c
Boston	4.25c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.45c
Det., No. 14 and lighter	3.38½c
New York	3.62c
Philadelphia	3.40c
Pittsburgh(h)	3.70c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c

COLD FIN. STEEL	
Baltimore (c)	3.71c
Boston	4.00c-4.50c
Buffalo (h)	3.55c
Chattanooga*	4.06c
Chicago (h)	3.50c
Cincinnati	3.70c
Cleveland (h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	4.95c
New Orleans	4.30c
New York	3.92c-4.42c
Philadelphia	3.73c
Pittsburgh(h)	3.45c
Portland (f)	4.75c
San Fran.(f)(d)	5.95c
Seattle(f) (d)	4.75c
St. Louis	3.74c
St. Paul	3.20c
Tulsa	4.65c

COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati(b)	3.42c
Cleveland (b)	3.20c
Detroit	3.33c
New York	4.70c
St. Louis	3.36c

(b) Plus straightening, cutting and quantity differentials.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
(g) 50 bundles or over.
(h) Outside delivery, 10c less.

‡Domestic bars.
*Plus quan. extras.
**Under 25 bundles.
*†50 or more bundles.
†New extras apply.
††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Jan. 10

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15.13 3 1 6	$13.78	1 14 0
Basic bessemer	13.53 2 15 0*	12.97	1 12 0
Hematite, Phos. .03-.05	15.38 3 2 6	.....	.....
SEMIFINISHED STEEL			
Billets	$27.06 5 10 0	$19.04	2 7 0
Wire rods, No. 5 gage	38.38 7 16 0	36.49	4 10 0
FINISHED STEEL			
Standard rails	$38.13 7 15 0	$44.60	5 10 0
Merchant bars	1.65c 7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.62c 7 7 6	1.13c	3 1 6
Plates, †¼ in. or 5 mm.	1.76c 8 0 0	1.51c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.04c 9 5 0	2.13c	5 16 0
Sheets, gal., 24 gage, corr.	2.48c 11 5 0	2.38c	6 10 0
Bands and strips	1.87c 8 10 0	1.46c	4 0 0
Plain wire, base	2.04c 9 5 0	1.96c	5 7 6
Galvanized wire, base	2.48c 11 5 0	2.30c to 2.33c	6 5 6 to 6 7 6
Wire nails, base	2.64c 12 0 0	2.11c	5 15 0
Tin plate, box 108 lbs.	$ 4.43 0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16.61	3 7 6(a)	$13.90	210	$14.57	310	$25.36	63
Basic bessemer pig iron	16.61	3 7 6(a)*	12.25	185	13.16	280	27.97 (b)	69.50
Furnace coke	4.31	0 17 6	7.94	120	5.17	110	7.65	19
Billets	27.06	5 10 0	28.47	430	20.68	440	38.84	96.50
Standard rails	1.82c	8 5 0	2.08c	694	2.31c	1,100	2.42c	132
Merchant bars	1.89c	8 12 0	1.68c	560	1.16c	550	2.01c	110
Structural shapes	1.93c	8 15 0	1.65c	550	1.16c	550	1.97c	107.50
Plates, †¼-in. or 5 mm.	1.99c	9 1 3	2.10c	700	1.47c	700	2.32c	127
Sheets, black	2.31c	10 10 0§	2.55c	850‡	1.63c	775‡	2.64c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.86c	13 0 0	4.50c	1,500	3.15c	1,500	6.77c	370
Plain wire	2.04c	9 5 0	3.15c	1,050	2.31c	1,100	3.17c	173
Bands and strips	2.06c	9 7 0	1.95c	650	1.47c	700	2.32c	127

*Basic. †British ship-plates. Continental, bridge plates. 24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a del. Middlesbrough. b hematite.
**Gold pound sterling carries a premium of 66.47 per cent over paper sterling.

Bars

Bar Prices, Page 38

Pittsburgh — Automobile parts manufacturers are now as prominent in the bar market as at any time since last May or June, and some fairly heavy orders for forging quality bars have been placed. Specifications by agricultural implement makers have not diminished and textile machinery manufacturers have been more active. The 1.80c, Pittsburgh, base on carbon bars is observed, as well as the alloy base of 2.45c, Pittsburgh.

Cleveland—The market continues active, bookings by some leading producers in the first ten days this month exceeding those for the entire month of January last year. A strong demand is noted from forging shops. Automobile partsmakers are taking considerable quantities of cold-rolled material. Miscellaneous requirements have improved.

Chicago—Increased demand for bars is noted from diversified consumers, with requirements of the automotive and farm implement industries leading. Miscellaneous bar consumers are increasing stocks moderately, based largely on favorable prospects for near future consumption.

Boston—Commercial steel, alloy and forging bar demand has improved slightly. Railroads have ordered little, but bolt and nuts makers have taken in additional requirements. Miscellaneous demand has also gained.

Philadelphia — While far from brisk, commercial steel bar demand shows some improvement. Larger consumers, such as railroads show little interest and recent demand from bolt and nut manufacturers has tapered. The market is 2.09c, Philadelphia.

Washington—Bureau of supplies and accounts, navy department, will take bids Jan. 18 on 8600 pounds of round and hexagon grade 1 and 7300 pounds of grade 7 corrosion-resisting bar steel.

Plates

Plate Prices, Page 38

Pittsburgh—Seven plate fabricators recently submitted bids on considerable 21 and 28-inch dredge pipe for the Fort Peck, Mont., dam dredges, over 500 pieces of this pipe being fabricated of ¼-inch plate and 88 pieces being made of ¾-inch plate. Taylor Forge & Pipe Works, Chicago, was low at $63,879.52 on the complete project. Pittsburgh Plate Glass Co. plans rebuilding two tanks in conection with its Henryetta, Okla., plant improvement. Reports of river barge orders continue to be heard but most inquiries are circulated privately. Plates continue to be firmly quoted on the basis of 1.80c, Pittsburgh.

Cleveland—Bookings are light, although larger than in the comparable December period, with the plate mill here operating at about 25 per cent. Manufacturers of tanks for dairy and chemical industries report improved demand.

Chicago—Plate demand is slow, with outlook for early improvement uncertain. Railroad requirements continue light and little business in equipment building and repairs is in early prospect.

New York—Substantial oil company buying, particularly for export features the plate market, with a good tonnage going to South America. American platemakers are reliably reported to have lost a substantial tonnage for a penstock for South America to German makers, due to a German government subsidy. Miscellaneous plate demand is increasing.

Boston—Plate buying continues light with most orders for miscellaneous requirements in small lots. There is a lack of tank work and few plate fabricators have backlogs. Prices are firm at 2.20c, Boston.

Philadelphia—Plate buying includes several small tonnages for the navy and some small miscellaneous requirements. Maryland Dry Docks, Baltimore, is low on the Erie ferryboat, requiring several hundred tons of plates, shapes and bars, but no action has been taken. Sun Shipbuilding company, Chester, Pa., was second low bidder.

Bethlehem Shipbuilding Corp. has closed on a $500,000 contract for repairs and improvements to the ACHILLES, owned by the American Shipping Co., Buffalo. The work includes installation of automatic loading equipment.

Washington — Bureau of supplies and accounts, navy department, will take bids Jan. 18 on 17,150 pounds of class B and 5450 pounds class C marine boiler steel plate.

San Francisco — Over 6000 tons of plates were placed last week. McClintic-Marshall Corp., Bethlehem, Pa., took 1000 tons of 28-inch welded steel pipe for the Fort Peck, Mont., dam project.

Seattle—Plate sellers report improved demand, due to construction at the Coulee, Wash., dam. Increased volume in light plates for tank and boiler work also is in evidence. Taylor Forge & Pipe Works, Chicago, is low at $54,315 for furnishing dredge pipe and fittings for the Fort Peck, Mont., project.

Contracts Placed

1000 tons, 28-inch welded pipe, Fort Peck, Mont., to McClintic-Marshall Corp., Bethlehem, Pa.

100 tons, specification M-2034, metropolitan water district, Los Angeles, to Western Pipe & Steel Co., Los Angeles.

100 tons, 20,000-barrel oil tank, Du Pont interests, Edge Moor, Del., to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

4100 tons, specification 84, metropolitan water district, Los Angeles; bids opened.

4000 tons, 63,000 feet welded pipe, water and power department, Los Angeles; bids opened.

700 tons, including shapes and bars, Erie railroad ferryboat, Maryland Dry Docks, Baltimore, low bidders.

Unstated tonnage, $85,000 repairs to barges for United States engineers, to Sun Shipbuilding Co., Chester, Pa.

Unstated tonnage, mainly ¼-inch and ¾-inch plates for 21 and 28-inch dredge pipe, Fort Peck dam dredges, Wiota, Mont.; Taylor Forge & Pipe Works, Chicago, low at $63,879, followed by Treadwell Construction Co., Midland, Pa., $66,348, and McClintic-Marshall Corp., Bethlehem, Pa., $67,874.

Unstated tonnage, two steel barges, 100 x 30 x 6 feet; bids Feb. 6 to United States engineer, Washington.

Sheets

Sheet Prices, Page 38

Pittsburgh—Based on full-finished sheet orders placed by the automotive industry last week, operations in the sheet industry will advance this week to a strong 60 per cent. Full-finished sheet production is considerably in excess of this percentage. Other buying is well balanced. Prices are steady.

Cleveland — While automobile manufacturers are not placing contracts covering first quarter requirements, some sheetmakers operating close to capacity and with backlogs for several weeks are allotting tonnage to customers, as they did in 1929. Specifications must be received by certain dates, or the material goes to other consumers. The pressure has not relaxed, and some leading mill interests reported releases last week. There is a good general activity in production of household utilities and miscellaneous classifications.

Chicago — While sheet demand

continues to improve and operations generally are regarded as satisfactory, demand is somewhat spotty in that automotive needs have far outrun requirements of other users. Pressure from motorcar interests for prompt shipments is heavy and more rolling mills find it difficult to meet desired delivery.

Boston — Sheet buying has improved moderately with consumers requesting early delivery on most volume placed.

New York—The Amtorg Trading Corp. again is inquiring for a round tonnage of automobile steel, mainly sheets, for shipment to Russia. Recently, as noted at the time, Amtorg placed several thousand tons of sheets with American producers. Domestic sheet tonnage is improving moderately. On the second opening of bids for about 1200 tons for New York automobile license plate stock, Bennett Mfg. Co., Alden, N. Y., was again low, with prices below those originally submitted.

Philadelphia — Apart from the placing of further substantial tonnage by local autobody makers, sheet demand is spotty. Jobbers are specifying lightly.

Washington—Bids are to be taken Jan. 25 by bureau of supplies and accounts, navy department, for 12,050 pounds of grade one, class six, corrosion-resisting sheet steel.

Buffalo — Buffalo district sheet mills are operating at 50 per cent. Automotive orders are coming forward in good volume.

Cincinnati — Sheet mills in this district are near 70 per cent. Most of the demand is from automobile manufacturers.

St. Louis—Sheet activities have not fully reacted from the inventory period. Requirements of railroad equipment builders are at a low level. Producers look for an increase in orders before the end of the month.

Birmingham, Ala. — Sheet mill operations are steady. Agricultural districts are showing more interest in galvanized sheets.

Transportation

Track Material Prices, Page 39

Some buying of equipment and reviving interest in rail requirements give the market an appearance of promise. Chicago, Burlington & Quincy plans to buy 15,000 tons of rails and about 4000 tons of accessories and the Interborough Rapid Transit, New York, is in the market for 2000 tons of rails. Louisville & Nashville, James B. Hill, president, announces early placing of considerable steel, principally rails, with mills at Birmingham, Ala. City light officials at Seattle expect to inquire shortly for 200 tons of rails for the Skagit project railroad.

Southern Pacific is inquiring for 26,740 tons of rails for 1935 laying.

Domestic freight car orders for 1934 totaled 23,829, December purchases being 110 cars. This is the largest total since 1930, Comparisons follow:

	1934	1933	1932	1931
Jan.	152	3	159	100
Feb.	19,725	0	35	50
March	30	5	105	2,166
April	800	50	0	2,798
May	717	8	60	20
June	1,835	500	0	1,910
July	19	306	25	617
Aug.	105	202	5	1,304
Sept.	7	23	1,298	703
Oct.	75	514	0	980
Nov.	254	533	2	35
Dec.	110	316	50	11
Total	23,829	2,460	1,739	10,694

Relaying rails are quoted $1 lower on a slow market, but a strengthening of scrap is expected to restore the former level soon.

Safety Car Heating & Lighting Co., New York, has received orders for air conditioning installations on approximately 250 cars within the past month, bringing the total for 1934 to about 500.

Live Oak, Perry & Gulf, Minneapolis, has applied to the interstate commerce commission to construct 20 miles from Swan, Fla., to Foley Junction, Fla., giving access to phosphate deposits.

Seaboard Air Line receivers have applied to the interstate commerce commission for construction of 7½ miles at an estimated cost of $141,000 from near Jackson, Fla., to the new plant of the Union Bag & Paper Co., Dames Point, Fla.

Buses Placed

Public Service Co-ordinated Transport Co., subsidiary of Public Service Corp. of New Jersey, Newark, N. J., 62 buses, to General Motors Truck Co., Detroit, and Mack International Motor Truck Corp., New Brunswick, N. J.

Locomotives Placed

Chicago Great Western, one 800-horsepower diesel-electric switching locomotive to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Car Orders Placed

Dominion Coal Co. Ltd., subsidiary of Dominion Steel Corp. Ltd., Montreal, Que., 120 coal cars, including 20 of dumper type, to Eastern Car Co. Ltd., Trenton, N. S.

Inland Steel Co., Chicago, 175 mine cars to American Car & Foundry Co., New York.

Rail Orders Pending

Southern Pacific, 26,740 tons; bids asked.

Interborough Rapid Transit, New York, 2000 tons rails; bids in mid-January.

Pipe

Pipe Prices, Page 39

Pittsburgh — Tubular products moved in heavier volume last week. As yet, however, important line pipe activity is lacking. Some slight improvement in electric conduit pipe is noted and mechanical tubing specifications are distinctly on the increase.

Electric Steel Foundries, Portland, Oreg., is low on one hundred 21-inch discharge pipe sand valves and one hundred sixty 16-inch discharge pipe sand valves for dredges at the Fort Peck, Mont., dam. Omaha Steel Works, Omaha, Nebr., is low on thirty-two 7½-degree land pipe elbows, sixteen 15-degree land pipe elbows and eight 45-degree elbows for the same dredges.

Cleveland—The market for cast pipe is quiet, and some small lots for public works have been booked at $2 a ton under scheduled prices. Activity in waterline extensions among small towns in northern Ohio has been aided by FERA's offers to pay labor charges. Carload orders for jobbers' stocks of steel pipe are more numerous than in December.

Chicago—A few small tonnages of cast pipe are pending in this district for filter and sewage disposal plants, but closing is deferred. About 300 tons of cast pipe will be placed shortly for the Hammond, Ind., filter plant.

Boston—Cast pipe buying is sluggish. Westfield, Mass., has placed 120 tons of cast and Woburn, Mass., close to 100 tons of steel pipe, but substantial inquiry is lacking. Utilities are showing but slight interest.

Philadelphia—Steel pipe production in this district is holding at 40 to 45 per cent.

Buffalo—Several large tonnages of pipe for the oil and gas fields, and for water line extensions are expected to be closed this quarter. The current outlook is for a brisk first half.

Birmingham, Ala. — Numerous small-tonnage orders from PWA water projects in the immediate vicinity and adjoining states are being placed. Inventories are completed but no indication is noted that raw material will be carried beyond current needs.

San Francisco—Movement of cast pipe is confined to small lots. Pros-

pects, as regards standard steel pipe and oil country goods, are encouraging.

New York—The city will ask bids shortly on a heavy tonnage of cast pipe, comprising its best inquiry in several years, to be let direct for yard stocks, and through contractors.

Seattle—Business continues slow, with only occasional calls for small tonnages out of stock.

Cast Pipe Placed

1200 tons, 36-inch and under, Erie, Pa., to United States Pipe & Foundry Co., Burlington, N. J.

127 tons, watermains, Avon Lake, O., to United States Pipe & Foundry Co., Burlington, N. J.; FERA project.

Steel Pipe Placed

610 tons, dredge pipe and fittings, Fort Peck dam, Mont., to Taylor Forge & Pipe Works, Chicago.

Cast Pipe Pending

500 tons, 6-inch and under, natural gas line, Jackson to Canton, Miss., United States Pipe & Foundry Co., Burlington, N. J., low.

242 tons, 4 and 6-inch, class 150, Oakland, Calif.; bids in.

150 tons, watermains, Wooster, O.; bids in.

100 tons, watermains, Perrysville, O.; bids Jan. 15.

Steel Pipe Pending

675 tons, 6-inch, natural gas line, Jackson to Canton, Miss., Allegheny Steel Co., Brackenridge, Pa., low.

Strip Steel

Strip Prices, Page 39

Pittsburgh—Hot-rolled strip steel orders are gaining in volume and although many buyers ask prompt shipment, other users are issuing February specifications. Many small users, taking carload requirements, are asking a week's delivery. Base prices are firm and unchanged at 1.85c, Pittsburgh, for hot strip and 2.60c, Pittsburgh or Cleveland, for cold strip.

Cleveland — Leading strip producers report specifications improved during the week, although in one instance a lighter volume of releases from automobile interests was noted. Demand from automobile manufacturers apparently has not yet reached its peak. Moderate lots for stoves and office building partitions were booked.

Chicago — Strip mills are comfortably booked with automotive material and note a moderate gain in demand from miscellaneous users. In shipments and in some instances producers are behind on requested deliveries.

Boston — There is a spotty improvement in hot strip. While there has been some gain in demand for cold-rolled, the improvement has been slight with narrow widths in the lead.

Philadelphia — While there is some gain in buying of strip by smaller consumers, little interest has yet been shown by larger buyers and the local strip market is far from active. Prices are steady.

Quicksilver

New York—Quicksilver prices are unchanged in a generally quiet market. Round lots of 100 virgin flasks of 76 pounds are quoted down to $72.50 a flask, but small lots of 15 to 24 flasks inclusive are being held at $74.

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Los Angeles—San Francisco—Houston—Boston

Shapes

Structural Shape Prices, Page 38

New York—Structural steel inquiry tends upward with more medium-size projects in view, mainly public work. Awards include several bridges in New York and New Jersey. The latter state's acting governor last week revoked the state NRA laws, which in effect abolishes the state structural steel code authority, an important action touching on direct steel bidding on public work. Close to 23,000 tons is active in the district.

STEEL'S record of structural shape awards in 1934 — including all items of 100 tons or more — totaled 863,078 tons. This, it develops, was about 85 per cent of the actual total, a very thorough representation. Official reports to STEEL on finished steel distribution in 1934 from 87 operating companies, Jan. 7, page 112, show 1,048,077 tons for shapes over 3-inch size. Incidentally, this was an increase of 42 per cent over 1933.

Cleveland—One of the best prospects here is the $9,000,000 government housing project, ground for the first of three sections having been cleared. An effort is being made to have the government adopt steel frames for the new buildings. Railroad bridge repair work continues to develop small lots, and there is a sprinkling of other industrial work.

Philadelphia—Fabricators here are figuring on 1500 tons for the naval aircraft plant to be erected at the local navy yard. Little else is active.

Chicago—About 4000 tons of shapes is involved in new inquiries, but with the exception of 1200 tons for a gas cleaning plant for the Ford Motor Co., this tonnage will be required for state bridges. Illinois opens bids Jan. 18 on 900 tons and Indiana Jan. 15 on 825 tons. A Detroit fabricator is low on 2300 tons of fabricated steel for the Guttenberg, Iowa, dam.

Pittsburgh—Weekly Pennsylvania state highway lettings continue about 400 tons in three bridges having been closed Jan. 11, and 964 tons in three bridges, bid Jan. 4 now being purchased by general contractors. Dravo Contracting Co., Pittsburgh, last week awarded about 800 tons of permanent piling for the Gallipolis, O., dam.

Boston—Small-lot inquiry, mainly for public works, including postoffices, schools and hospitals, is heavier. Awards are light. In Massachusetts all general contract bids, including steel and material quotations, must now be filed in duplicate with the official bid depository, such being located at Boston, New Bedford, Worcester and Springfield.

Buffalo — A fair demand is in sight for the first quarter. Lots ranging up to 500 tons are nearing the contract stage.

San Francisco — Inquiries and orders are light, and bookings during the week did not exceed 600 tons. Bids will be opened Jan. 24 for 1141 tons, including 916 tons of sheet steel piling, for a state highway project in Ventura county, California. No award has yet been made on 2158 tons of sheet piling for the Government island, Oakland, Calif., bulkhead.

Seattle — Bids will be received by the reclamation bureau, Denver, Jan. 21 for a $100,000 steel and concrete warehouse at Coulee, Wash., to include a 7½-ton crane. Fabricating shops are not busy, but steel interests report prospects are improved for larger tonnages this year.

Shape Contracts Placed

1340 tons, state highway bridge, Sallisaw, Okla., to Wisconsin Bridge & Iron Co., Milwaukee.

1300 tons, parcel post building, Richmond, Va., to American Bridge Co., Pittsburgh, through J. A. Jones, Charlotte, N. C.

800 tons, permanent piling, Gallipolis, O., dam; divided between Jones & Laughlin Steel Corp., and Carnegie Steel Co., Pittsburgh, by Dravo Contracting Co., Pittsburgh, general contractor.

800 tons, pier, New York Dock Co., Brooklyn, N. Y., to Post & McCord, New York; American Bridge Co., Pittsburgh, to fabricate.

789 tons, bridge, Fox Lake, Ill., to McClintic-Marshall Corp., Bethlehem, Pa.

547 tons, bridge, Pompton river, Passaic and Morris counties, New Jersey, to American Bridge Co., Pittsburgh; through Tidewater Stone & Supply Co., Hackensack, N. J.

450 tons, bridge, NRM 186B, Cloud county, Kansas, to Pittsburgh-Des Moines Steel Co., Des Moines.

450 tons, two state highway bridges, Elk, Kans., and Clay Center, Kans., to St. Joseph Structural Steel Co., St. Joseph, Mo.

405 tons, bridge NRS 517A, Wyandotte county, Kansas, to Kansas City Structural Steel Co.

310 tons, postoffice and court house, Abilene, Tex., to McClintic-Marshall Corp., Bethlehem, Pa.

300 tons, addition, Bowen building, Washington, to McClintic-Marshall Corp., Bethlehem, Pa.

293 tons, state bridge, Monterey county, California, to unnamed interest.

250 tons, gates and hoists, specification 604, Boulder dam, Boulder City, Nev., to unnamed interest.

245 tons, state bridge over Erie railroad, Pompton Plains, N. J., to American Bridge Co., Pittsburgh; through Franklin Contracting Co.

200 tons, bridge over Mystic river, Somerville, Mass., to Wisconsin Bridge & Iron Co., Milwaukee.

127 tons, state highway bridge RC 3595, Oswego county, New York, to McClintic-Marshall Corp., Bethlehem, Pa.; Walter S. Johnson Building Co., Niagara Falls, N. Y., general contractor. Kalman Steel Corp., Bethlehem, Pa., awarded 68 tons of reinforcing steel.

125 tons, Sol Duc river bridge, Washington, and other projects, to Steel Fabricators Inc., Seattle.

110 tons, three state crossings in Utah county, Utah, to unnamed interest.

105 tons, I-beam spans, Cherokee county, Iowa, to Pittsburgh-Des Moines Steel Co., Des Moines.

100 tons, building, Youngstown Brewing Co., Youngstown, O., to Builders Structural Steel Co., Cleveland.

100 tons, buildings for state hospital, Camarrillo, Calif., to Consolidated Steel Corp., Los Angeles.

100 tons, branch library building, Georgetown, D. C., to Dietrich Bros., Baltimore; Bahen & Wright Inc., Washington, general contractor. Kalman Steel Corp., Bethlehem, Pa., awarded 24 tons of reinforcing steel.

Unstated tonnage, school, Wayland, Mass., to New England Structural Co., Everett, Mass.

Shape Awards Compared

	Tons
Week ended Jan. 12	**9,246**
***Week ended Jan. 5**	**24,023**
Week ended Dec. 29	**7,855**
This week in 1934	**28,252**
Weekly average, 1934	**16,284**
Weekly average, 1935	**16,634**
Weekly average, December	**9,078**
Total to date, 1934	**43,213**
Total to date, 1935	**33,269**

*Revised

Shape Contracts Pending

5100 tons, dam No. 10, Guttenberg, Iowa; McCarthy Improvement Co., Davenport, Iowa, low for general contract. R. C. Mahon Co., Detroit, low for 2300 tons shapes. Inland Steel Co., Chicago, low for 2800 tons piling.

3000 tons, pier No. 45, Manhattan, New York; Cauldwell-Wingate Co., low.

1500 tons, naval aircraft factory, Philadelphia; bids to be opened Jan. 30; approximately 400 tons of bars also required.

1300 tons, bridge, Norfolk, Va.

1200 tons, gas cleaning plant, Ford Motor Co., Rouge, Mich.

1141 tons, including 916 tons of sheet piling, state highway work, Ventura county, California; bids Jan. 24.

1025 tons, state bridges, Kansas.

900 tons, five state bridges, Illinois; bids Jan. 18.

825 tons, state bridge, Indiana; bids Jan. 15.

730 tons, public school No. 146, New York; John Kennedy Co., low.

600 tons, state bridge, Myrtle Beach, S. C.

450 tons, bridges, Erie and Delaware counties, New York.

458 tons, 1400-foot, three-span, through truss bridge, Lawrence township, Tioga county, Pennsylvania; Graham Construction Co., Lancaster, Pa., low on general contract at $87,192.

290 tons, state highway bridge, Gassaway, W. Va.

286 tons, bridge, Liberty township, Bedford county, Pennsylvania; B. B. Construction Co., Philipsburg, Pa., low at $88,803 on Dec. 28 bids. This project also requires 89,375 pounds of plain steel bars.

250 tons, bulkhead gates, Boulder dam, Boulder City, Nev.; bids Jan. 28.

220 tons, bridge, Lower Providence township, Montgomery county, Pennsylvania; James McGraw Co., Philadelphia, Pa., low on general contract at $156,209.

133 tons, including machinery, navigation lock span, Bonneville, Oreg., project; bids in.

164 tons, railroad overhead bridge, Chester county, Pennsylvania; D. C. Warfel, Lancaster, Pa., low at $112,200. This project also requires 31 tons of plain steel bars.

150 tons, dormitory Rhode Island state college, Kingston, R. I.

150 tons, Middlesex county tuberculosis hospital, New Brunswick, N. J.

150 tons, public school No. 2, Queens, New York.

Reinforcing

Reinforcing Bar Prices, Page 39

Pittsburgh—New billet steel bars in straight lengths continue to be quoted 2.05c, base Pittsburgh, by distributors, the market observing the usual $4 a ton differential below this figure on a mill base. Dravo Contracting Co., Pittsburgh, is closing on about 800 tons of new billet bars for the Gallipolis, O., dam on which it was awarded general contract late last week.

Cleveland—More than 40 bids were submitted for the 1100 tons of reinforcing bars for the Muskingum, Ohio, conservancy district, opened by United States engineers at Zanesville, O., last week. As prices are uniform, award probably will be made by drawing. Bids on another tonnage of steel which go in Jan. 18 include 90 tons of stainless, for dam gates. Miscellaneous awards during the week consisted of small lots.

Chicago—While more than 6000 tons of bars is involved in several pending projects, awarding of this tonnage still is delayed. Largest job pending is the Milwaukee filter plant requiring about 4000 tons and a similar structure at Michigan City involving 1000 tons.

Boston—Reinforcing bar awards are light, but a substantial volume pends on which general contracts have been awarded. New inquiry includes several hundred tons for buildings at the City hospital, Worcester, Mass.

Philadelphia—Reinforcing bar sellers look for little activity until February, when it is believed that new state road projects will begin appearing and some action will be taken by contractors on work they have already received.

New York—Reinforcing steel lettings are up slightly, but the bulk of a fairly substantial pending volume, mainly highways and bridges has yet to be placed. Funds for work on the Triboro bridge have been delayed by a political controversey, holding up new figures on piers taking 625 tons.

An oil company in Venezuela is inquiring for 3000 tons of reinforcing bars and 500 tons of steel pipe.

San Francisco—Awards during the week aggregated 3215 tons, including 1785 tons for the metropolitan water district, Los Angeles, divided between two Los Angeles distributors. For the Hall of Records, Oakland, Calif., 930 tons were placed with Truscon Steel Co., Youngstown, O. The metropolitan water district, Los Angeles, is expected to place close to 60,000 tons during the first quarter.

Seattle—The week's awards were small and no important specifications are up for figures. Northwest Steel Rolling Mills, Seattle, took 110 tons for a state bridge over the Methow river, Washington.

Reinforcing Steel Awards

1785 tons, bid No. 20170, metropolitan water district, Los Angeles, divided between Blue Diamond Co., and Los Angeles Iron & Steel Co., Los Angeles.

1750 tons, Tygarts river reservoir dam, Grafton, W. Va., to Carnegie Steel Co., New York; through Frederick Snare Corp., New York.

Concrete Awards Compared

	Tons
Week ended Jan. 12	6,560
Week ended Jan. 5	938
Week ended Dec. 29	2,624
This week in 1934	9,359
Weekly average, 1934	4,084
Weekly average, 1935	3,749
Weekly average, December	2,408
Total to date, 1934	12,616
Total to date, 1935	7,498

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930 tons, Hall of Records, Oakland, Calif., to Judson Mfg. Co., Oakland, Calif.

400 tons, warehouse, Caswell Co., San Francisco, to Truscon Steel Co., San Francisco.

350 tons, high school building, Venice, Calif., to unnamed interest.

300 tons, mesh, Albany-Schenectady turnpike, New York, to Kalman Steel Corp., Bethlehem, Pa.

160 tons, bridge, Pompton river, Passaic and Morris counties, New Jersey, to Joseph T. Ryerson & Sons Inc., New York; through Tidewater Stone & Supply Co., Hackensack, N. J.

150 tons, filtration plant, Hartford, Conn., to Carroll-McCreary & Co. Inc., Brooklyn, N. Y.; F. H. McGraw, New York, general contractor.

150 tons, building for state hospital, Camarillo, Calif., to unnamed interest.

156 tons, westerly sewage disposal plant, Cleveland, to Patterson-Leitch Co., Cleveland; through Hunkin-Conkey Construction Co., Cleveland.

125 tons, bridge and approaches, Dedham, Mass., to Truscon Steel Co., Youngstown, O.

110 tons, state bridge Methow river, Washington, to Northwest Steel Rolling Mills, Seattle.

100 tons, Outlook building, Santa Monica, Calif., to unnamed interest.

100 tons, alterations, William McKinley school, Los Angeles, to unnamed interest.

Reinforcing Steel Pending

14,000 tons, track depression project and west side elevated highway section, Manhattan, New York Central railroad, postponed to Jan. 15, 18 and 29.

800 tons, dam No. 10, Guttenberg, Iowa; Inland Steel Co., Chicago, low. McCarthy Improvement Co., Davenport, Iowa, low for general contract.

800 tons, Gallipolis, O., dam; Dravo Contracting Co., Pittsburgh, awarded general contract.

500 tons, road work, Illinois; bids opened Jan. 4.

475 tons, buildings, veterans' hospital, Tougas, Me.; Charles P. Wills Inc., New York, low on general contract.

320 tons, grade separations, Kings and Queens counties, New York.

200 tons, buildings, City hospital, Worcester, Mass.; taking bids.

150 tons, Cross street school, Somerville, Mass.; bids in.

100 tons, various Washington state highway projects; bids in.

100 tons, bureau of roads bridge, Rainier national park, Washington; Jordan & Eldon, Portland, Oreg., low.

Unstated, warehouse, Coulee, Wash.; bids by reclamation bureau, Denver, Jan. 21.

Unstated, Calhoun avenue, bridge, Juneau, Alaska; bids soon.

Unstated, repairs to government dredge CLATSOP; general contract to Heiser Machine & Marine Works, Portland, Oreg.

Wire

Wire Prices, Page 39

Pittsburgh — Heavier orders for automotive wire products, including spoke and spring wire, plain manufacturing wire and rods feature the market. The market is quoted on a Pittsburgh base as follows: 2.30c for plain wire, 2.90c for spring wire, $2.60 per keg on wire nails and $63 per base column on woven wire fencing.

Chicago — Most of the improved demand for wire is accounted for by manufacturers' wire consumers. While larger users cover quarterly requirements, smaller consumers are ordering more sparingly.

Cleveland — Further gains in orders and tonnage for wire and wire products are noted here. Demand for manufacturers' wire is the most active.

Boston—Wire mill operations are higher and demand broader. There has been considerable improvement in specialties and manufacturers' wire.

The Worcester, Mass., mill has booked about 7000 feet of wire rope railing at Lowell, Dracut and Methuen, Mass.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 39

Discount of 70-10-10 off list on carriage and machine bolts now applies on spot business. Many larger users who made heavy bolt and nut purchases before the price advance, are now releasing in steady volume but have not yet tested the new price. Inactivity of structural fabricating shops is still a detriment to large rivets and railroad car shops are not expanding schedules. Large rivets are 2.90c, Pittsburgh or Cleveland, and 3.00c, Chicago.

Nut and bolt production has been increased 20 to 25 per cent, due to increased demand from automobile manufacturers, bringing operations for the industry about 45 per cent.

Cold Finished

Cold Finished Prices, Page 39

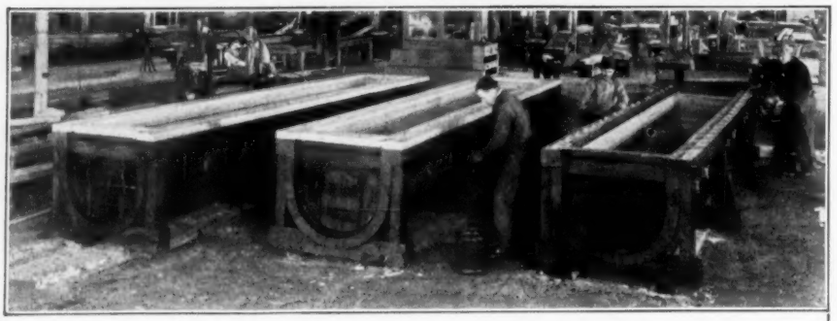
Pittsburgh—With many jobbers of cold-finished steel bars completing inventories, heavier specifications for cold drawn bars are expected. The market is strong on orders from automotive concerns, textile machinery manufacturers and producers of farm implements. For carbon bars, 2.10c Pittsburgh, is quoted and for alloy quality 2.95c, Pittsburgh.

Tin Plate

Tin Plate Prices, Page 38

Pittsburgh — Tin plate specifications have increased, and a leading interest again is at strong 60 per cent rate, while the average for the industry has advanced to 50 per cent. Recent surveys of both canmakers' stocks of unworked tin plate and canners' inventories of finished containers showed that volume is considerably below January, 1934.

New York—Large canners are plac-



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ing substantial tonnages for rolling in the next several weeks. The extent of present orders is exceeding expectations.

Pig Iron

Pig Iron Prices, Page 40

Pittsburgh—The market is inactive and melters not already using a large percentage of scrap are buying in little more than two and three carloads at a time. Practically no consumer inventories are being accumulated. The Neville Island base on foundry iron of $18.50 per ton, on bessemer at $19.00 and on basic at $18.00, is quoted firmly.

Cleveland—So far the automobile and agricultural implement industries have provided the chief stimulus to pig iron shipments, with demand from heating apparatus manufacturers tapering off, and railroads buying little material. Some pig iron producers who recently increased output have had to purchase new equipment. Since shipments have risen, bad order freight cars have appeared at furnace yards for hauling pig iron and have had to be rejected; examples of how obsolescence is becoming more noticeable. In pig iron there is less hand-to-mouth buying, and more extended coverage. Most of the current inquiries concern analyses.

National Tube Co., Lorain, O., has lighted another blast furnace, operating three of its five stacks.

Chicago—Shipments so far this month are more than 40 per cent ahead of December and are nearly 35 per cent heavier than a year ago. Improvement in foundry operations is fairly general although schedules of jobbing foundries remain spotty. Farm implement producers and automotive interests experience the best operating rates, with some slight betterment noted in production of railroad castings.

Boston—Except for one purchase of 700 tons by a Providence, R. I., consumer, pig iron shipments are small. Many consumers have failed definitely to cover on first quarter requirements and will buy as needed.

New York—A fair tonnage of pig iron is moving here, although the market is far from active. Virtually all orders are for immediate shipment and confined, with few exceptions, to lots of 100 tons and under.

Philadelphia—Pig iron releases are spotty, with sellers looking for improvement this quarter.

Buffalo—Pig iron is selling more readily and in larger quantities. Aggregate bookings since the first of the year are reported to be larger than those of any two weeks' period since last June.

Cincinnati—Shipments are increasing in this district and the melt is proportionately heavier. Only a few melters covered first quarter needs, others continuing to order as needed.

St. Louis—The market displays considerable activity, with specifications and new business the past week or ten days in substantially larger volume. Sales during the past several days totaled around 6500 tons, including all grades.

Birmingham, Ala.—Active shipment of pig iron is noted, practically all tonnage going to nearby foundries. Additional blast furnaces may be placed in production by the end of month. This point has been recognized as a base on malleable iron, a price of $14.50 having been filed with the American Iron and Steel institute, effective Jan. 7. This compares with $14.50 on No. 2 foundry, $13.50 on basic and $19 on bessemer, at this point.

Toronto, Ont.—Business in Canadian pig iron is beginning to show some revival. The daily melt is holding at better than 35 per cent.

Semifinished

Semifinished Prices, Page 39

Round-lot purchases of sheet bars and wire rods by nonintegrated buyers have featured the semifinished steel market. An Ohio sheet roller purchased a large lot of sheet bars last week, and many bolt and nut concerns and automobile builders have been frequent buyers of rods.

Scrap

Scrap Prices, Page 41

Pittsburgh—Following three weeks of quiet, at least two district mills here last week purchased scrap. One paid $13, delivered, for about 2000 tons of No. 1 heavy melting steel and the other paid $13.50 per ton for the same grade, followed by a subsequent purchase at $13.25. The latter buyer also purchased No. 2 steel in successive orders at $12.50 and $12.25. While these prices were reaffirming the local market, railroad scrap was taking its usual premium and a Wheeling district mill was understood to have paid close to $15 early last week.

Cleveland—A further advance of 50 cents per ton has been made on practically all grades of steel and iron scrap. A tonnage of heavy melting steel has been taken by a local melter at $11.50, delivered, for No. 1. A purchase by a Valley melter was at $13.50 for No. 1 steel. Borings and turnings did not participate in the rise.

Chicago—Scrap prices continue to advance, with heavy melting steel up $1 a ton to $12.50 to $13. Indi-

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cations that the rise in prices, which now has extended for nearly two months, has not ended are seen in bids offered by sellers in anticipation of future mill purchases. Some steelworks are short of scrap and heavy buying is in prospect, which is expected to result in a further appreciation in prices due to apparent scarcity of old material around current levels.

Boston — Higher prices are quoted by dealers on several grades of scrap, including heavy melting steel for export, $9 having been paid for No. 1, dock. Most buying is for export against contracts. Heavy melting steel for domestic delivery has advanced 25 cents and up to $6 f.o.b. is being paid for skeleton. Domestic activity is somewhat heavier.

New York—Scrap prices are firm, notably heavy melting steel for export, with dealers paying $8.75 for No. 1, barge, and $7.25 for No. 2. In a few instances these grades have been bought at 25 cents a ton higher. Activity is largely confined to buying for export against old orders.

Philadelphia—Steel and iron scrap are strong although there is little new buying to test the market on important grades. Export movement continues but all against old orders. Sellers are slow to accept current offers.

Buffalo—Dealers report an offer to buy No. 1 heavy melting steel at $11.50, with $10.50 bid for No. 2. It is reported lots up to 1000 tons have been sold at these prices. Other grades have firmed and dealers are having difficulty in buying at profitable prices.

Detroit — Prices of scrap are unchanged but the market continues strong. Steelworks are somewhat less anxious to make new purchases since scrap production has increased and is sufficient to accommodate present needs.

Cincinnati — Quotations on iron and steel scrap were marked up sharply during the past week, recent sales to mills marking the turning point. The new buying for mill accounts is in fair volume but has not included large tonnage contracts.

St. Louis—In face of scant buying by melters iron and steel scrap is strong, with prices rising. Dealers with contracts are endeavoring to cover. Melters are feeling out the market with intention of buying.

Birmingham, Ala. — Improved conditions are not yet noticeable in scrap iron and steel though better feeling has been admitted and readjustment of price list made. Purchases have been in limited quantities.

Seattle — Present movement of scrap consists of former commitments and new business is small. Sellers look for firmer prices but Oriental buyers are not inclined to raise offers.

Toronto, Ont. — Minor improvement has appeared in demand for iron and steel scrap. Mills in the Hamilton district continue to take heavy melting steel, but turnings are moving slowly. Montreal dealers also report some betterment in steel grades and fair market for iron grades.

Warehouse

Warehouse Prices, Page 42

Pittsburgh—Jobbers note increased orders and shipments. Improvement is most apparent in out-of-town shipments. Prices are unchanged.

Cleveland—Some warehouse interests here report orders and tonnage so far this month 10 to 20 per cent better than in the comparable period in December.

Chicago—Sales have improved since the holiday period. Demand is well diversified though building materials still move slowly.

Boston—While warehouse volume has improved since the holidays, the recovery is slow.

Philadelphia — Moderate buying characterizes jobbing demand. Some leading jobbers look for January to be quiet, with February showing substantial gain. Prices are unchanged.

Detroit—Business makes a favorable comparison with December and January a year ago. Little recession was noted during the holiday period. Prices are unchanged.

Cincinnati—Sales of steel from warehouse have turned upward since the holidays. Plates and bars are active, and small lots of structural materials are moving.

St. Louis—Following the holiday and inventory period, business of warehouses is showing a decided gain. Requirements are mainly miscellaneous and small.

San Francisco — While movement of warehouse material is somewhat restricted, due to inventory-taking, most distributors believe first quarter will show a decided improvement over last year. Prices are unchanged.

Metallurgical Coke

Coke Prices, Page 39

A highly unsettled coke market in the New York district was reached last week when it became known that German interests were promising New York district coke wholesalers shipment of 25,000 tons of by-product domestic coke from Germany which they would deliver in Brooklyn, N. Y., for around $6 a ton. The market for western Pennsylvania coke oven operators, who sell fairly large tonnages in this district, had been around $7 a ton, although recent shading had been reported down to $6.80 a ton. On a Connellsville,

Pa., oven basis metallurgical grades are without significant test as many melters are taking only occasional carloads.

Nonferrous Metals

Nonferrous Metal Prices, Page 40, 41

New York—Demand for nonferrous metals last week held steady with prices generally unchanged. Antimony, however, rose to the highest level since 1927 while tin advanced fractionally.

Copper—Interest centered in the meeting of producers in London and the pending world conference on curtailing output. No definte announcement was made on progress made. Sales showed daily improvement with the price steady at 9.00c, Connecticut.

Lead — Sales were moderately active and on the basis of 3.55c, East St. Louis. Outlook is considered favorable.

Zinc—Prime western held at 3.75c, East St. Louis, despite report that stocks rose 3978 tons during December.

Tin—Supplies of prompt metal were scarce in this country and prices moved up to around 51.12½c.

Antimony—Chinese spot was quoted 14.50c, duty paid, New York, during the latter part of the week. The sharp rise was due to a strong market in China and scarcity of supplies here.

Aluminum—Code has been extended further for a period of 45 days from Jan. 6. Metal is still available at 19.00c for 99 per cent plus.

Iron Ore

Iron Ore Prices, Page 40

Cleveland—Of the 22,027,055 tons of iron ore shipped from the Lake Superior mines last year 15,582,211 tons was nonbessemer; 5,228,497 bessemer; 695,096 manganiferous; and 521,251 silicious. The proportion of nonbessemer was 70.7 per cent, compared with 68.8 per cent in the preceding year. Bessemer ore represented 23.7 per cent, down from 26.4 per cent in 1933; manganiferous 3.1 per cent in both years; and silicious 2.3 per cent in 1934, compared with 1.5 per cent in 1933.

As there is always 30,000,000 tons or more iron ore in reserve at lower lake ports and furnaces, the slight change in proportionate shipments last year is without significance.

The gain in nonbessemer is accounted for by the larger production from the Mesabi range, due to the more economical mining in open pits. Range shipments last year follow: Mesabi 14,774,667 tons; Marquette 2,396,339; Gogebic 2,263,896; Menominee 1,317,445; Vermillion 777,230; Cuyuna 497,478. The Mesabi's proportion increased to 67 per cent compared with 62.3 per cent in 1933. Less ore was shipped from the Marquette, Gogebic, Menominee and Cuyuna ranges than in 1933.

The Lake Superior Iron Ore association reports receipts at Lake Erie ports for 1935, and shipments therefrom to interior furnaces, as follows:

	Receipts	Shipments	Dock Balance, Jan. 1, 1935
Buffalo	1,630,319	7,789	2,962
Erie	902,533	916,820	117,173
Conneaut	3,294,610	3,282,781	1,873,380
Ashtabula	1,742,708	1,708,027	1,537,975
Fairport	678,722	683,905	387,403
Cleveland	4,035,905	2,657,841	848,866
Lorain	2,106,963	1,165,259	12,527
Huron	396,321	373,778	360,795
Toledo	784,442	395,955	14,250
Total	15,572,523	11,192,155	5,155,331
Year ago	16,323,050	11,993,278	5,326,674

Receipts at other ports:

	Tons
Detroit	790,709
Indiana Harbor	1,349,426
Gary	1,599,068
South Chicago	2,173,923
Sault Ste. Marie, Ontario	120,984
Hamilton, Ontario	420,554
Total	6,454,664
Comparative, one year ago	5,084,644

Philadelphia — Chrome ore arrivals continue heavy, with importations of 9588 tons at this port in the week ended Jan. 5, the largest for any similar period in a long time. Close to 5000 tons came from Cuba, with 3500 from Portuguese Africa, and 1100 from British India.

Steel in Europe

Foreign Steel Prices, Page 42

London—(*By Radio*)—Steel markets in Great Britain are quiet, in part due to the Scottish holidays, which end next week. Good pig iron tonnages are being shipped to various foreign destinations. Steel finishing mills are active, and railroad buying promises to be heavy. Inquiries for steel for export are fairly encouraging. Dorman, Long & Co. Ltd. have booked 8000 tons of plates for export to Russia.

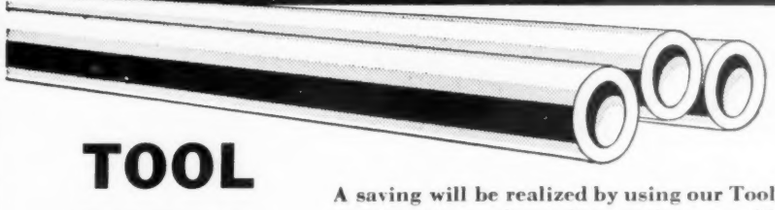
The Continent reports export trade quiet, with some orders from China and South America. Prospects in the French steel industry are improving.

Ferroalloys

Ferroalloy Prices, Page 40

Ferromanganese demand continues to broaden, in line with improved steelmaking, particularly in the Middle West. Prices are steady at $85 duty paid, Atlantic and Gulf ports.

NONSHRINK OIL HARDENING



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Cincinnati Chicago Philadelphia

Domestic spiegeleisen, 19 to 21 per cent, is unchanged at $26, furnace, on quantities up to 50 tons, and $24 on 50 tons and over.

Coke By-Products

Coke By-Product Prices, Page 39

New York — Demand for toluol has improved, notably for lacquer-making. Other distillates are slightly more active with prices firm, following the reduction on benzol to 15 cents a gallon, tank lots, producers' plants. Phenol buying is steady.

Here and There In Industry

PULLMAN INC., Chicago, has consolidated various domestic manufacturing subsidiaries into a new organization to be known as the Pullman-Standard Car Mfg. Co. of Delaware. It will be headed by C. A. Liddle, who has been president of the Pullman Car & Mfg. Corp. Units included in the consolidation are Pullman Car & Mfg. Corp., Dickson Car Wheel Co., New Orleans Car Wheel Co., Standard Steel Car Corp. (Del.), Standard Steel Car Corp. (Pa.), Pullman-Bradley Car Corp. and the Richmond Car Corp.

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Metal Package Corp., subsidiary of the McKeesport Tin Plate Co., McKeesport, Pa., has acquired the business of the Colonial Can Co., Boston.

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S. C. Weber Iron & Metal Co. has succeeded the Consolidated Iron & Metal Co., Chattanooga, Tenn., effective Jan. 1.

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Tungsten Production Co., Lovelock, Nev., J. B. Maxwell, manager, has several thousand tons of tungsten ore in bins and a large ore body to develop after the close of winter.

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Macwhyte Co., Kenosha, Wis., manufacturer of wire rope and braided wire rope slings, has appointed Brown-Wales Co., 493 C street, Boston, distributor of its products.

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Smith & Dunne Inc., Raymond boulevard and route 25, Newark, N. J., has been appointed eastern representative of the Erie Steel Barrel Co., Erie, Pa., handling its full line of steel drums and containers.

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American Pulverizer Co., St. Louis, has enlarged its line by addition of several sizes of ring crushers and a complete line of hammer mills. The company now builds an all-steel mill with manganese steel liners and antifriction bearings.

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Lima Locomotive Works, Lima, O., has consolidated its wholly-owned crane and shovel subsidiary, Ohio Power Shovel Co., also at Lima, with the parent company. December was one of the best months in the experience of the crane division.

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American District Steam Co., North Tonawanda, N. Y., has appointed R. E. Martin, 1027 Hunt building, Tulsa, Okla., its exclusive sales agent for Oklahoma. He will handle the full line of the American District Steam Co. meters, heaters, traps, valves and other specialties.

□ □ □

Western Gas Construction Co., Fort Wayne, Ind., has been consolidated with its parent company, the Koppers Construction Co., Pittsburgh, and will continue its business as the Western Gas Construction division of the Koppers Construction Co. The consolidation, dating from Jan. 1, involves no change in physical operations.

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A. O. Smith Corp., Milwaukee, has increased its working force from 3000 in early December to 4600 for the second week in January. This results from increased demand for automobile frames. In addition to its regular orders from General Motors and others, the Smith plant will fabricate frames for half the 1935 Plymouth cars.

□ □ □

Bethlehem Steel Co., Bethlehem, Pa., has established depot facilities at Houston, Tex., utilizing the former buildings of the Midwest Piping & Supply Co. Inc., 600 Bringhurst street, near Clifton Drive. This step has been taken because of increasing demand for steel materials in the South, particularly for sheet and wire products.

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Mississippi Valley Equipment Co., 511 Locust street, St. Louis, has bought the goodwill, records and business of the Zelnicker Supply Co., following the death of Mr. Zelnicker. R. H. Whisler, A. R. Topping and C. H. Wehner, members of the new organization, were department managers of the Zelnicker company and a number of others were associated with the former company.

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Armstrong Cork Co. and Armstrong Cork & Insulation Co., Lancaster, Pa., have formed a subsidiary, Armstrong Cork Products Co., which from Jan. 1 will handle sales of all products of the two companies. Change in name of the sales organization does not alter distribution policies or personnel and all corporate functions other than marketing will be continued under the name Armstrong Cork Co.

Equipment

Pittsburgh — Several promising wide strip mill inquiries still are active, among them one for Bethlehem Steel Co. at Buffalo, and another for Great Lakes Steel Corp. at Detroit. Rotary Electric Steel Co., Detroit, recently placed an order with E. W. Bliss Co., Salem, O., for a small blooming mill to be installed at its Detroit works. Lukens Steel Co., Coatesville, Pa., has installed a large press brake capable of cold bending plates up to 1 inch thick. This machine was built by the Cincinnati Shaper Co., Cincinnati.

Bids were taken Jan. 9 by the St. Paul, army engineers on seven locomotive cranes to be placed at dams under construction on the upper Mississippi river.

Boston—Machinery builders start the year with heavier inquiry from private industry and are figuring more equipment than for several months. For grinding machinery some substantial export volume has been done. There are also inquiries for automobile plant machinery.

New York — Niles-Bement-Pond Co. has booked contract for plate glass manufacturing machinery for Japan, value of the equipment totaling several thousand dollars, one of the largest orders yet placed in this country for machinery of this type for shipment abroad. The equipment will be built at the Hooven, Owens, Rentschler plant, Hamilton, O. The contract was placed by Mitsubishi Shoji Kaisha Ltd., Tokyo, through its New York branch.

Contracts for more than $500,000 of machinery and equipment for New York technical schools will be readvertised. Bids were opened several months ago and the bulk of the volume was tentatively awarded to one dealer, but readvertising was ordered. Bids on two 10-ton 66-foot span cranes for the Brooklyn navy yard have been postponed to Jan. 18.

Chicago—Equipment markets are more active and demand for certain types of metalworking tools has improved rather substantially so far this month. Activity still is spotty but is broadening, particularly among miscellaneous metalworking interests. The Reading railroad in the East is inquiring for a list of 25 tools. The farm implement industry is a fairly active buyer of small tools.

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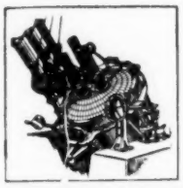
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Construction and Enterprise

New York

NEW YORK—Standard Oil Co. of New Jersey, 30 Rockefeller Plaza, is planning to expend between $50,000,000 and $56,000,000 for improvements and additions to facilities in the United States in 1935, and about $17,000,000 on steel pipe, machinery and other construction materials to be sent abroad. Plans for production of crude oil and construction of pipe lines will require about $36,000,000. This year's program will require an expenditure of 6 per cent more than in 1933.

Pennsylvania

ERIE, PA.—Independent Iron & Metal Co., recently sustained damages by fire to the interior of its storehouse.

MARS, PA.—Universal Steel & Alloy Co., Mars, Butler county, Pa., a newly-organized concern which plans to utilize a manufacturing plant here, is planning to manufacture a complete range of ferroalloys by a process claiming cheap production, low fusion point and absence of carbon in the resulting product. Robert McKnight, 1126 Mellon street, Pittsburgh, president of the company, plans to install roasters, crushers and other auxiliary refining equipment.

Michigan

DETROIT—Henze Mfg. Co. has been organized to deal in mechanical devices, by Paul Henze, 280 Harmon avenue.

KALAMAZOO, MICH.—Kalamazoo Stove Co., Arthur L. Blakeslee president, has begun construction of an addition to its enameling plant to cost about $25,000. New equipment will be installed.

KALAMAZOO, MICH.—Riverside Foundry & Galvanizing Co. has purchased the Gerline Brass Foundry Co., manufacturer of brass, bronze and aluminum castings and alloy products. The Gerline foundry will be re-opened at once and will be conducted as the brass division of the Riverside company.

NEW ERA, MICH.—New Era Canning Co., Chester A. Ray manager, has started construction of a 30 x 60 foot boiler house near the canning plant.

PORT HURON, MICH. — Mueller Brass Co. is planning an expansion program for 1935, and will probably add new equipment to make certain new products, including a packless refrigerator valve of the expansion type.

SAGINAW, MICH.—Banner Brewing Co. is considering making alterations to its brewing plant. George Bright Co., Detroit, engineer.

Indiana

ANDERSON, IND.—Greer Steel Co., Dover, O. has acquired a 36-acre tract of ground here for building a new steel manufacturing plant for the production of cold-rolled strip steel. Cost of buildings and equipment is estimated at about $500,000. Construction will start in the spring.

COLUMBUS, IND.—Work is nearing completion on the new locomotive building of the Cummins Engine Co. here, and machinery is being moved in. Heavy diesel products, including locomotive units, will be built in the new building.

INDIANAPOLIS — Carson-Haymond Industries Inc., 301 Medical Arts building, has been formed to engage in general manufacturing, particularly ferrous and nonferrous metals, by Ray G. Carson, Roscoe Haymond and Francis W. Barlet.

INDIANAPOLIS—Automatic Burner Sales Co. Inc., has been formed to manufacture heaters, stoves and furnaces, by Orville Wise, resident agent. William N. Harding Jr. and Maude E. McConnell.

Alabama

MOBILE, ALA.—Kraftliner Gumming Corp., Arnold Jacoby vice president, is planning to install new machinery at its plant at Magazine Point, Ala., and may also erect an additional building.

North Carolina

SHELBY, N. C.—Carolina Dairy Inc., 211 North Lafayette street, will improve the dairy plant it recently acquired and will install equipment. Morrison Falls Co., Shelby, N. C., contractor.

WINSTON-SALEM, N. C. — City, George W. Coan mayor, is considering erection of municipal power plant.

South Carolina

COLUMBIA, S. C.—City, L. B. Owens, mayor, has under consideration plans for a municipal power plant to cost $700,000.

GREENWOOD, S. C.—Dan T. Duncan, supervising engineer for Lyles-Ford Tri-County Authority, is making surveys to determine the most advantageous place on Broad river for erection of a power plant.

Missouri

KANSAS CITY, MO.—Missouri-Kansas Steel Corp. has been organized with capital of $100,000 by E. L. Hudson and Charles W. Lovelace, 435 West Fifty-ninth street.

PACIFIC, MO.—City has PWA loan and grant of $87,000 for construction of waterworks.

ST. LOUIS—Tooley Welding Co. has been incorporated by Grant U. Tooley, 5334 National building, and Ernest L. McQuaig.

Arkansas

HOT SPRINGS, ARK. — Arkansas Power & Light Co., care Harvey C. Couch, is considering expending $6,000,000 for rural electrification program in 53 Arkansas counties.

Oklahoma

HENRYETTA, OKLA.—Pittsburgh Plate Glass Co., Pittsburgh, has begun expansion work at its plant here, which will amount to an expenditure of about $500,000. Among improvements and additions will be three new cutting rooms, warehouse enlargements, rebuilding two tanks, additions to the reannealing division and a brick kiln extension. A. B. McClure is superintendent of the plant here.

Texas

AMARILLO, TEX.—Amarillo Welding & Machine Co. has been formed with $28,000 capital, by C. E. Johnson and C. W. Johnson.

DALLAS, TEX.—Burdett Oxygen Co. of Texas, unit of Compressed Industrial Gases Inc., Chicago, has leased a building at 3002 Canton street which it will occupy after improvements are completed. Glenn Gammon is manager.

Wisconsin

DARLINGTON, WIS.—At a special election it was voted to purchase the Commonwealth Electric Co. property as nucleus of a new municipal generating plant and to issue $125,000 bonds to cover purchase and improvements. C. V. Howery is city clerk.

MILWAUKEE—Twin-Flex Corp., Detroit, has completed transfer of plant and offices to Milwaukee at 2021 South Fifty-fourth street, and in addition to regular line of six-wheel attachments for Ford and Chevrolet light trucks, will extend its line to include third axles for other light trucks and auxiliary transmission assemblies.

South Dakota

SIOUX FALLS, S. DAK.—John Morrell & Co., meat packer, will soon start construction of a 2-story packing plant addition to cost about $50,000. H. Peter Henschien, 59 East Van Buren street, Chicago, architect.

Iowa

WATERLOO, IOWA—West Side Welding Co., August A. Koloc proprietor, has awarded contract for addition and remodeling to welding shop.

WATERLOO, IOWA—Rath Packing Co., Sycamore and Elm streets, has awarded contract for construction of 1-story cold storage addition, 82 x 115 feet, to cost about $50,000, including machinery and cold storage equipment.

Montana

VICTOR, MONT.—L. O. Thomas, George Clark and Bryant Clark will build a mill at the old Curlew mine. A 50-ton unit will be built at first, but will be expanded later.

Idaho

POTLACH, IDAHO—Forest Products Inc. is making extensive improvements and extensions to its saw mill, which will again be in operation in April.

Pacific Coast

PORTAND, OREG.—Iron Fireman Mfg. Co., 4784 Southeast Seventeenth avenue, has taken a permit to enlarge its storage facilities.

CAMAS, WASH.—Hoffman Construction Co., Portland, Oreg., has contract to construct a dock and marine terminal for the Crown-Willamette Paper Co. Total cost is estimated to be about $200,000.

RAYMOND, WASH.—The machine shop of Camp No. 1 of the Willapa Harbor Lumber Co. recently suffered damages by fire.

SEATTLE—Rainier Brewing Co. will soon begin work on rehabilitation of the local plant. Renovation of the boiler plant will be done first.

WALLA WALLA, WASH.—Libby, McNeill & Libby, United States yards, Chicago, are planning erection of a $200,000 canning plant here. C. B. Kile is Pacific northwest manager.

Dominion of Canada

MAYO, B. C.—The large and modern lumber plant of the Mayo Lumber Co. recently sustained damages by fire. Rebuilding plans have not yet been announced.